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MESOAMERICAN *BACTRIS* (PALMAE)

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Mesoamerican *Bactris* (Palmae). The genus *Bactris* Jacq. ex Scop. in Mesoamerica is reviewed, based on field and herbarium study of morphology. A key is provided to distinguish the twenty species, two with two varieties each, recognized from the region. Each species and variety is described, including distribution and habitat. Four species are new to science (*B. charnleyae*, *B. grayumii*, *B. kunorum*, and *B. panamensis*) and two varieties (*B. mexicana* var. *trichophylla* and *B. glandulosa* var. *baileyanus*) represent new combinations. The synonymy which is provided accounts for all names which have been used in the Mesoamerican region.

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The Neotropical *Bactris* Jacq. ex Scop. (Palmae, Arecoideae, Cocoeae) is notorious among students of palms. Specimens are difficult to prepare because of the spininess of the plants, and so there are relatively few collections in herbaria. Those that do exist are often fragmentary, and flowers are seldom represented because of the short time of anthesis. Natural variation has been misunderstood, and a surplus of names has been proposed. The types of many of these have been destroyed in both Brazil (those of Barbosa Rodrigues and Wallace) and Berlin (those of Burret). The major publications on the genus (Burret 1933, 1933–1934) contain neither keys nor illustrations, and are difficult to use. They are actually a catalogue of names. The species are readily recognizable, both in the field and from well-collected specimens, and the number of species is certainly much smaller than the 250-plus names suggest. Henderson et al.

(1995) recognize 64 species. Recent intensive collecting in Central America, together with the publication of a cladistic study of *Bactris* (Sanders, 1991), has made the genus less difficult to understand.

Sanders (1991) emphasized fruit characters for phylogenetic analysis. We have experienced difficulties in interpreting some of these characters. We could not see tubercles or papillae at the bases of the endocarp fibers in the Central American members of the Tuberculate clade (*B. coloniata*, *B. major*, *B. maraja*, *B. militaris*, *B. pilosa*), with the possible exception of *B. militaris*. We had difficulty seeing displaced endocarp pores in the Mesomerican members of the Tuberculate clade; indeed we considered that *B. pilosa* had the most symmetrical endocarp pores of any Mesomerican *Bactris*, and some non-members of the clade had more or less asymmetrical endocarp pores (e.g., *B. coloradensis*). The interpreta-

tion of the endocarp pores depends on how many character states one can distinguish; Sanders distinguished three states, we saw two. We had difficulty interpreting pitted endocarps. *Bactris militaris* has two populations, one with pitted endocarps and the other with smooth endocarps (see discussion under that species). A second species, *B. kunorum*, also has pitted endocarps, but this species appears to belong to the non-fibrous clade. We had difficulty interpreting juice sacs attached to endocarp fibers. In most members of the Atropurpureous clade these were obvious, but we also saw them in an orange-fruited species, *B. charnleyae*. We also had difficulty interpreting rachis bracts of the inflorescence, because they are hard to see and the shapes are difficult to divide into discrete character states.

This paper treats all of the *Bactris* species of Mesoamerica, and refers to synonymy the excess names that have been applied to the genus in the region. Synonyms from outside the region are excluded. We cite specimens only from Mesoamerica. This forms part of a treatment of the Palmae for *Flora Mesoamericana*, and a revision of the whole genus which is in preparation by Henderson.

There are problems with lectotypification in the genus. Some have considered that citation of a specimen by Burret (1933, 1934), Dahlgren (1936, 1959) or Glassman (1972) constitutes lectotypification. However, according to Greuter (1988, art. 8.3), unless the word "type" is specifically used in reference to a specimen, that specimen cannot be considered to have been designated as lectotype.

BACTRIS JACQ. EX SCOP.

Small to large, solitary or (usually) clustered, spiny, pleonanthic, monoecious, protogynous palms. Leaves pinnate, or pinnately veined if simple; sheath open, with or rarely without an ocrea; petiole very short to long; rachis usually long; pinnae regularly arranged or clustered, variously shaped, acuminate or rarely praemorse apically, or often the leaf simple and bifid. Inflorescences interfoliar, rarely infrrafoliar, once-branched or spicate; prophyll much shorter than the peduncular bract; rachillae usually covered with trichomes; flowers arranged in triads, these regularly arranged proximally along the rachillae or more often scattered amongst paired or solitary staminate flowers, staminate flowers only distally; staminate flowers sessile or pedicellate, asymmetrical; sepals connate into a 3-lobed calyx; petals connate basally, free apically (in Mesoamerica); pistillode absent; stamens 6 (in Mesoamerica), dorsifixed, filaments inflexed apically; pistillate flowers sessile; sepals connate into a tubular or annular calyx; petals connate into a tubular corolla; staminodes absent, small and triangular, or connate into a staminodial ring; gynoecium trilocular, triovulate; fruits 1-seeded, small to large, variously shaped, usually orange or yellow, or purple-black; mesocarp floury or juicy; endocarp with or without fibers attached, the pores at or above the equator; endosperm homogeneous; eophyll bifid; germination adjacent-ligular.

KEY TO MEXICAN AND CENTRAL AMERICAN SPECIES OF BACTRIS

1. Stems 4–15 m tall, 10–14 cm diam; sheaths lacking an ocrea; petiolar spines in 3 longitudinal lines; fruits to 5 cm long, 3 cm diam; always cultivated or planted *B. gasipaes*.
1. Stems 0.8–10 m tall, 0.5–8 cm diam; sheaths with an ocrea; petiolar spines not in 3 lines; fruits less than 4.5 cm long; naturally occurring.
 2. Rachillae (24–) 40–90, filiform; triads ± regularly arranged on proximal part of rachillae.
 3. Fruits glabrous; pinnae pubescent abaxially (almost glabrous in var. *baileyana*), linear to narrowly elliptic, without prominent cross-veins. *B. glandulosa*.
 3. Fruits covered with short bristles; pinnae glabrous abaxially, linear, with prominent cross-veins *B. barronis*.
 2. Rachillae 3–34 (–51), not filiform; triads scattered amongst paired or solitary staminate flowers.
 4. Ripe fruits yellow, orange, or red.
 5. Leaves simple, elongate with parallel sides; peduncle erect, not recurved; Costa Rica and Panama *B. militaris*.
 5. Leaves pinnate, or simple but then not elongate and parallel-sided; peduncle erect or recurved.
 6. Peduncle erect, not recurved; stems small, 1–3 m tall, 0.5–1.5 cm diam; rachillae 3–12, 2–5 cm long.
 7. Leaves pinnate with numerous, glabrous pinnae *B. panamensis*.
 7. Leaves usually simple, often pilose abaxially.
 8. Pinnae pilose abaxially; peduncle with appressed, brown spines; fruits 1.2–1.5 cm diam; endocarp fibers absent or few *B. hondurensis*.
 8. Pinnae glabrous; peduncle with elongate, black spines; fruits 5–8 mm diam; endocarp with numerous fibers *B. charnleyae*.
 6. Peduncle strongly recurved; stems large, 2.5–6 m tall, 2–6 cm diam; rachillae 8–51, 4.3–29 cm long.
 9. Leaves simple or irregularly divided, glabrous, thick and leathery; fruits ovoid, not rostrate, fruiting calyx truncate; lowlands in Nicaragua (Chontales, Zelaya) and Costa Rica (Limón, San José) *B. grayumii*.
 9. Leaves pinnate to simple, glabrous to pubescent, not thick and leathery (except *B. kunorum*); fruits ovoid, obovoid, or turbinate, rostrate or not; fruiting calyx crenate, irregularly divided or truncate; widely distributed.
 10. Leaves thick and leathery, glabrous; fruits 1.1–1.2 cm long, prominently rostrate; Panama (Panamá, San Blas) *B. kunorum*.
 10. Leaves not thick and leathery, glabrous to pubescent; fruits variously sized, not prominently rostrate; widespread.
 11. Rachillae 14–29 cm long; fruits ca. 1.5 cm long, briefly rostrate; pinnae usually with prominent cross-veins *B. coloradonis*.
 11. Rachillae 6–16 cm long; fruits mostly smaller, rostrate or rounded; pinnae usually without prominent cross-veins.
 12. Fruiting calyx 3-lobed; fruits prominently rostrate; rachillae few (7–17); sheath, petiole and rachis densely and minutely spinulose; mostly above 600 m elevation *B. dianeura*.
 12. Fruiting calyx truncate; fruits rounded or obscurely rostrate; rachillae many (15–35); leaves not minutely spinulose; mostly below 600 m elevation.
 13. Inflorescences compact with closely spaced rachillae, these 5–10 cm long; pinnae glaucous, concave below; Atlantic slope of Nicaragua, Costa Rica and Panama .. *B. caudata*.

13. Inflorescences lax with loosely spaced rachillae, these 7–16 cm long; pinnae green, not concave below; widespread.
14. Leaf rachis with black spines; pinnae linear to linear-lanceolate, 35–85 cm long, usually pubescent abaxially; rachillae 26–38; Mexico to NE Nicaragua 17. *B. mexicana*.
14. Leaf rachis without any spines; pinnae, ± sigmoid, 25–35 cm long, often glabrous abaxially; rachillae 15–21; SE Nicaragua to Panama 9. *B. gracilior*.
4. Ripe fruits purple-black or yellowish brown.
15. Pistillate flowers and fruiting perianth without staminodial ring; fruits 1.5–2.5 cm long, 1.3–2 cm diam.
16. Fruits either covered in short, brown bristles or minutely spinulose; fruiting perianth only slightly shorter than the corolla.
17. Fruits yellowish brown, covered in short, brown bristles; leaf spines yellowish brown; pinnae glabrous 4. *B. coloniata*.
17. Fruits purple-black, minutely spinulose; leaf spines black; pinnae pubescent 20. *B. pilosa*.
16. Fruits glabrous; fruiting perianth much shorter than the corolla.
18. Pinnae ± equally and briefly bifid at the apex; pinnae pale green and easily falling from dried specimens 11. *B. guineensis*.
18. Pinnae not bifid at the apex; pinnae dark green and not falling from dried specimens.
19. Leaf spines flattened, yellowish brown; pinnae sigmoid, lacking marginal spines 16. *B. maraja*.
19. Leaf spines terete, black; pinnae linear, with marginal spines 2–3 cm long 14. *B. longiseta*.
15. Pistillate flowers and fruiting perianth with staminodial ring; fruits 3.3–4.5 cm long, 2.3–3.5 cm diam 15. *B. major*.

1. Bactris barronis L. H. Bailey, Gentes Herb. 3:101. 1933.

TYPE. — PANAMA. Canal Area: Barro Colorado Island, 6 Jul 1931, L. Bailey 503 (holotype, BH).

Stems cespitose, forming dense colonies, 2–8 m tall, 3.5–8 cm diam, the internodes prominently spiny. Leaves 4–9; sheath 30–84 cm long, sheath and petiole densely black-spiny with spines to 11 cm long; petiole 14–57 cm long; rachis 0.7–2.4 m long; pinnae 31–45 per side, linear to linear-lanceolate, conspicuously cross-veined, setose marginally, usually regularly arranged and spreading in the same plane, occasionally irregular or with gaps; middle pinnae 47–72 cm long, 1.5–5.3 cm wide. Inflorescences interfoliar; peduncle (9–) 16–25 cm long, densely brown-spiny, tightly curved in fruit; prophyll 6–19 cm long; peduncular bract 18–51 cm long, covered with dense black spines to 1 cm long, after anthesis; rachis 3–8 (–17) cm long;

rachillae 80–90, filiform, to 12 cm long, ca. 1 mm diam; triads more or less regularly arranged on proximal part of rachillae, but sometimes intermixed with paired or solitary staminate flowers; staminate flowers deciduous, not seen; pistillate flowers 3 mm long, arranged on 1 side of rachillae; calyx minutely 3-lobed; corolla tubular, truncate, pubescent; staminodia absent; fruits densely clustered, subglobose or turbinate, with prominent, abrupt stigmatic residue, 1–1.6 cm diam, orange-red, covered with short bristles, glabrescent; mesocarp mealy; endocarp turbinate; endocarp fibers few, free, terete; endocarp pores equidistant; fruiting calyx minute, corolla 2–3 mm long, crenate, irregularly split by the enlarging fruit.

ADDITIONAL SPECIMENS EXAMINED. — PANAMA. Canal Area: Río Chilibre, Cook & Martin 67 (F, US); Barro Colorado Island, Bartlett 16727 (MICH), 16734 (MICH), 16872 (MICH), Croat 5500 (SCZ), 5867 (SCZ), 6534 (MO), 6541 (MO, SCZ), 8627 (MO).

8792 (MO), 9030 (MO, SCZ), 9127 (MO, SCZ), 9272 (MO, SCZ), 9450 (MO), 10297 (MO, SCZ), 10805 (MO), 10826 (MO), 10980 (MO), 11024 (MO), 11199 (MO), 15417 (MO), 16513 (MO). *Shattuck* 1080 (F, MO, US); trail from Chagres River to Agua Clara, *Bartlett & Lasser* 16890 (MICH), 16891 (MICH); Pipeline road 4 mi. N of Gamboa, *Gentry* 6052 (MO, PMA); near Gamboa, 9°05'N, 79°40'W, 50 m, *McPherson* 11705 (MO); Santa Rita Ridge, E of Colón, 200–300 m, *Gómez-Pompa et al.* 3190 (MO), *de Nevers et al.* 10651 (CAS, NY, COL); 4 km N of Arriaján, 115 m, *Nee* 7159 (MO, PMA, US). **Darién:** Parque Nacional del Darién, Estación Rancho Frío at N base of Cerro Pirre, ca 9 km S of El Real, along Quebrada Peresenico, 8°01'N, 77°44'W, 70–270 m, *de Nevers et al.* 8264 (CAS); Río Pererenico, *Duke & Bristan* 243 (MO, US). **Panamá:** Río La Maestra, 0–25 m, *Allen* 9 (MO); along PanAm Highway halfway between El Llano and Río Mamóní, *Duke* 5612 (MO); 2 km W of Gamboa, near Chagres air strip, 30 m, *Nee* 7560 (CAS, MO, PMA). **San Blas:** Yar Bired, 9°20'N, 79°08'W, *de Nevers* 6943 (MO); near Cangandí, 9°24'N, 79°24'W, 3–30 m, *de Nevers et al.* 7415 (MO).

DISTRIBUTION AND HABITAT. — Eastern Panama (Canal Area, Darién, Panamá, San Blas) and western Colombia (Antioquia, Chocó, Valle); lowland rainforest below 700 m elevation.

LOCAL NAMES AND USES. — Panama: *alar* (Kuna), *caña conga* (Spanish). The stems are used for making floors in Darién Province, Panama.

DISCUSSION. — This species is characterized by its compact inflorescences, numerous, filamentous rachillae, regularly arranged triads, lepidote to setose pistillate corolla, and spinulose fruits. Rarely, hybridization between this species and *Bactris gasipaes* occurs in the Chocó, Colombia (Bernal & Henderson, in prep.).

2. *Bactris caudata* H. Wendl. ex Burret, Repert Spec. Nov. Regni Veg. 34:230. 1934.

TYPE. — COSTA RICA. Alajuela: Río Sarapiquí, San Miguel, May 1857, H. Wendland 53 (holotype, B, destroyed; lectotype, GOET [here designated]; isolectotype, K).

Bactris dasychaeta Burret, Repert. Spec. Nov. Regni Veg. 34:215. 1934.

TYPE. — COSTA RICA. Cartago ("San José"): Turcurrique, 635–700 m, May 1899, A. Tonduz 13310 (holotype, B; isotypes BM, P, US).

Stems solitary or cespitose, 1–5 m tall, 2–2.4 cm diam, spiny on the internodes or lacking spines. Leaves 5–8; sheath 41–67 cm long, sparsely spiny; petiole 40–54 cm long, with a few black spines to 5 cm or more long; rachis to 98 cm long, lacking spines or with a few, black, terete spines to 6.5 cm long; pinnae 19–26 per side, irregularly arranged in clusters and spreading in various planes, linear to ovate, concave, smooth to plicate with veins prominent adaxially, long-acuminate, middle pinnae (21–) 40–50 cm long, 2.5–5 cm wide (apical one wider, narrowly obovate), glaucous, dark green adaxially, paler abaxially, glabrous, with forward- or backward-pointing spinules 1–3 mm long on the margins. Inflorescences interfoliar; peduncle to 11 cm long, 1–2 cm wide, sparsely to densely spiny, strongly recurved; prophyll 5.5–8.5 cm long, 2–2.5 cm wide; peduncular bract 16–36 cm long, 3–5.5 cm wide, sparsely to densely black-spiny; rachis 1.5–2 cm long; rachillae 18–31, 5–10 cm long, ca. 1 mm diam; triads scattered amongst paired or solitary staminate flowers proximally; staminate flowers not seen; pistillate flowers with calyx shallowly culpiform, acutely 3-lobed, 0.5 mm long; corolla tubular, acutely 3-lobed, 2.5 mm long; fruits in a tight bunch, ovoid, with prominent stigmatic residue, orange-red, 0.9–1.3 cm long, 1.1–1.2 cm diam, glabrous; endocarp turbinate; endocarp fibers lacking; endocarp pores equidistant; fruiting calyx minute, corolla truncate to crenate, 3 mm long.

ADDITIONAL SPECIMENS EXAMINED. — NICARAGUA. Río San Juan: 1 km E of Río Sábalos, 11°02'N, 84°27'W, 100 m, Moreno 23185 (MO). Zelaya: Caño Montecristo, E of Germán Pomares camp, 11°36'N, 83°52'W, 60–90 m, Moreno 15134 (MO); Caño Montecristo, "La Grupera," 11°33'N, 87°48'W, 10 m, Moreno & Sandino 14652 (MO).

COSTA RICA. Alajuela: Highway 15 between Naranjo and Aguas Zarcas, 8 km NE of Quesada, 600 m, Croat 46954 (MO); Guatuso de San Rafael, 10°43'N, 84°48'W, 80–100 m, Holm & Iltis 909 (MO), Holm & Iltis 910 (MO); 5 mi. from San Miguel, Langlois 1 (BH); 8 km NE of Villa Quesada, Molina et al. 17152 (F, NY). Cartago: Turrialba, Boynton 14 (BH), Boynton 17 (BH), 500–600 m, Córdoba 1 (BH), Córdoba 2 (BH), Córdoba 35 (BH), Córdoba 36 (BH), Córdoba 51 (NY), Córdoba 52 (BH), Córdoba 106 (BH), Grayum et al. 8475 (MO), Moore 6709 (BH); Sánchez 2 (CR); Pavones, Moore 6749 (BH).

Heredia: between Corazón de Jesus and La Virgen, Moore 6633 (BH).

PANAMA. Bocas Del Toro: Chiriquí Lagoon, Cayo Solarte (Nancy Island), near town of Bocas Del Toro, 9°20'N, 82°15'W, 5 m, McPherson 11486 (MO).

DISTRIBUTION AND HABITAT. — Nicaragua (Río San Juan, Zelaya), Costa Rica (Alajuela, Cartago, Heredia), and Panama (Bocas Del Toro); lowland rain forest below 800 m elevation.

DISCUSSION. — This species is characterized by its glaucous, linear to ovate, concave pinnae with spinules 1–3 mm long on the margins, and compact inflorescences with short rachillae.

3. *Bactris charnleyae* de Nevers, A. Henderson & Grayum, sp. nov.

Fig. 1.

TYPE. — PANAMA. San Blas: El Llano-Cartí road, 19.1 km from Interamerican highway, 9°19'N, 78°55'W, 150–350 m, 8 Jan. 1985, G. de Nevers et al. 4463 (holotype, MO; isotype, NY).

Statura parva foliis simplicibusque Bactris hondurensi similis sed fibris endocarpii numerosis distinctis spinis pedunculi longis nigrisque.

Stems cespitose, 0.5–2 m tall, 6–9 mm diam. Leaves 3–6; sheath 5–6 cm long, not deeply split opposite the petiole, truncate, sheath, petiole and rachis not spiny; petiole 7–11 cm long; rachis 11–15 cm long; blade simple, bifid, the lobes 13–18 cm long from top of rachis to apex, 4.5–9 cm wide at apex of rachis, with 10–14 main veins, these raised above, glabrous, veins with minute setae abaxially, leaf margins setose apically with spinules 1–7 mm long. Inflorescences interfoliar, projecting from the top of the sheath; peduncle 3–5 cm long, densely spiny with fine, straight spinules 6–8 mm long; prophyll 2–3 cm long; peduncular bract 8–8.5 cm long, 1.5–2.3 cm wide, moderately covered with fine, straight spinules 1.5–2.3 cm long; rachis 2–2.6 cm long;

rachillae 5–8, 1.5–3 cm long, ca. 1 mm diam; triads irregularly arranged amongst paired or solitary staminate flowers; staminate flowers not seen; pistillate flowers 2 mm long; calyx 3-lobed, 0.5 mm long; corolla 3-lobed, 2 mm long; staminodes present or absent; fruits globose, rostrate, 5–8 mm diam, orange or yellow, striate; mesocarp mealy; endocarp turbinate; endocarp fibers numerous, with juice sacs attached; endocarp pores equidistant; fruiting perianth with crenate corolla, 2 mm long, staminodes visible or absent.

ADDITIONAL SPECIMENS EXAMINED. — PANAMA. San Blas: El Llano-Cartí road, 19.1 km from Interamerican highway, 9°19'N, 78°55'W, 100–350 m, de Nevers 5982 (MO), 6187 (MO), km 32, Henderson & Herrera 715 (NY), km 12, Henderson & Herrera 731 (NY); Cangandí, 9°24'N, 79°24'W, de Nevers et al. 5714 (MO, NY), Herrera 205 (CAS).

DISTRIBUTION AND HABITAT. — Panama (San Blas); lowland rainforest at 25–300 m elevation.

LOCAL NAMES AND USES. — Panama: *bor* (Kuna), *uga wawad* (Kuna).

DISCUSSION. — This species is distinguished by its small size, simple, glabrous leaves, and densely spinulose peduncle and peduncular bract. There is only one specimen with ripe fruits, but these appear to have endocarp fibers with juice sacs attached. This situation is anomalous, since Sanders (1991) considered that orange-fruited species of *Bactris* lacked endocarp fibers with juice-sacs attached. Apart from this, *B. charnleyae* is very similar to *B. hondurensis*, from which it differs in its densely spiny peduncle and peduncular bract.

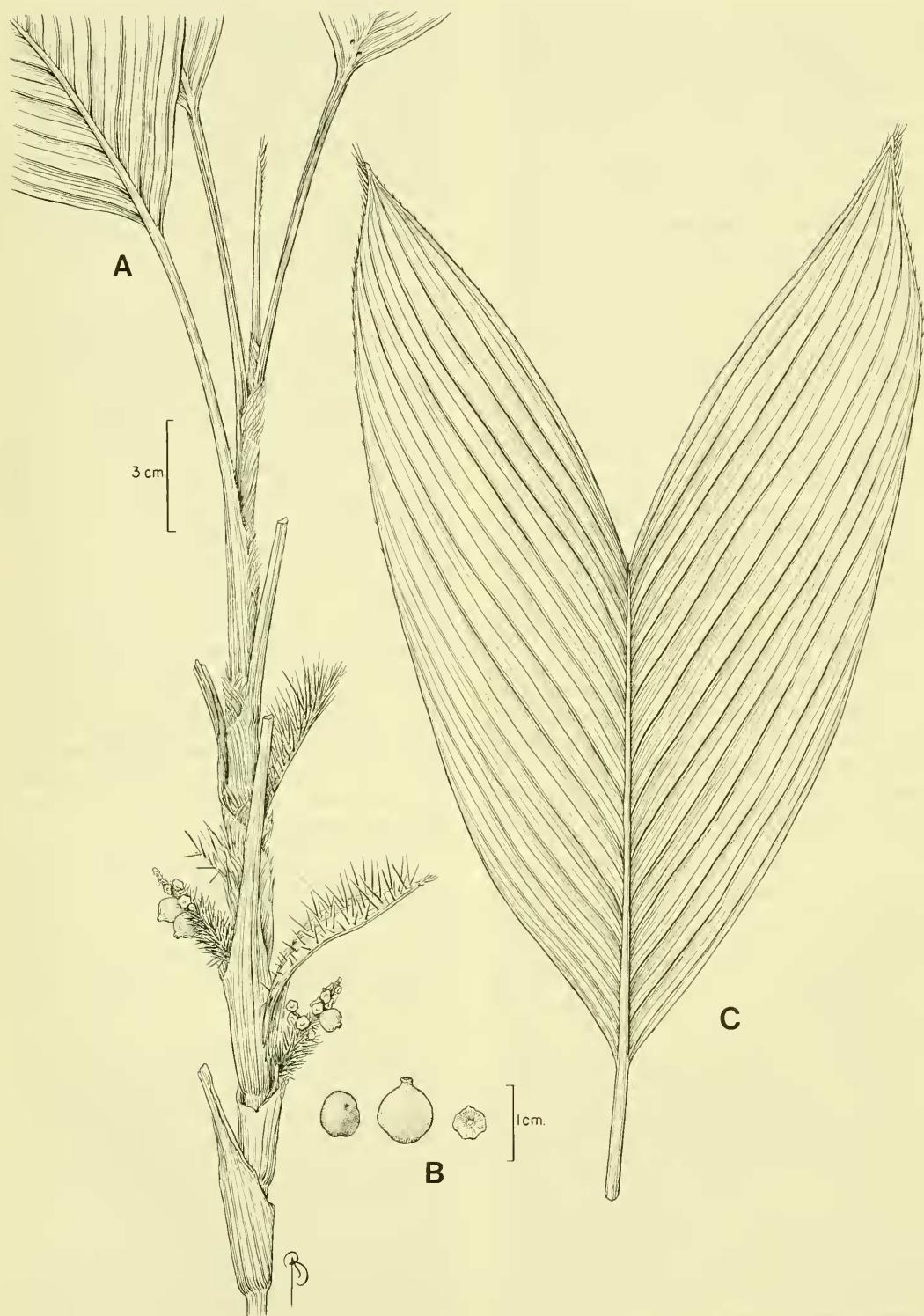
4. *Bactris coloniata* L. H. Bailey, Gentes Herb. 3:106. 1933.

TYPE. — PANAMA. Canal Area: Barro Colorado Island, 29 Jun 1931, L. Bailey 77 (lectotype, BH [here designated]).

Stems cespitose, rarely solitary, forming open colonies, 3.5–7 m tall, 2–5 cm diam, with spiny

FIGURE 1. *Bactris charnleyae* (de Nevers et al. 4463). A. Habit. B. Left to right: endocarp, fruit, fruiting calyx. C. Leaf blade. A & C same scale.





internodes. Leaves 5–7; sheath 27–80 cm long, sheath, petiole (and rachis) reddish-brown-tomentose, densely to moderately covered with yellowish brown to black, somewhat flattened spines; petiole 39–70 cm long; rachis (0.45–) 1.2–1.4 m long; pinnae (4–) 14–23 per side, regularly or irregularly arranged in clusters of 4–12, spreading in the same or various planes, linear-lanceolate, elliptic or slightly sigmoid, the apex long-caudate and drooping; middle pinnae 30–75 cm long, 2.5–7.2 cm diam, without conspicuous cross-veins, glabrous. Inflorescences interfoliar, peduncle 16–25 cm, strongly curved in fruit; prophyll 15–49 cm; peduncular bract (26–) 42–60 cm long, densely covered with appressed, brown, flattened spines, after anthesis; rachis 4–10 cm long; rachillae 9–16, 14–25 cm long, thick, to 3 mm diam in fruit; triads scattered amongst paired or solitary staminate flowers; staminate flowers 4 mm long; sepals free, linear, 1 mm long; petals connate below for ca. one-third their length, free and valvate above, 4 mm long; pistillate flowers 5 mm long; calyx tubular, 4 mm long; corolla tubular, 2 mm long, with minute bristles; staminodes absent; fruits very widely obovoid, markedly rostrate, 1.5–2.5 cm long, ca. 1.5 cm diam, yellowish brown, covered with short brown hairs; mesocarp floury; endocarp turbinate; endocarp fibers numerous, wiry, with juice sacs attached; endocarp pores equidistant; fruiting calyx only slightly shorter than the corolla, 4–5 mm long, both crenulate-margined.

ADDITIONAL SPECIMENS EXAMINED. — PANAMA. **Canal Area:** Barro Colorado Island, *Bangham* 555 (US), *Bartlett* 16716 (MICH), 16745 (MICH), *Croat* 5306 (MO), 5307 (MO), 6174 (MO), 6772 (MO), 7141 (MO, SCZ), 7434 (MO), 7439 (MO), 8039 (MO), 8343 (MO), 8787 (MO, SCZ), 8799 (MO), 9230 (MO), 11010 (MO), 11013 (MO), 11018 (MO), 11021 (MO), 11022 (MO, SCZ), 11102 (MO), 11103 (MO), 11144 (MO), 11198 (MO), 11642 (MO), 15252 (NY), 15257 (MO), 15408 (MO, NY), *Kenoyer* 161 (US); *Oppenheimer* 67-1-3-1020 (MO); between Fort Sherman and Fort San Lorenzo, *Croat* 15422 (MO); between Gatún and Fort Sherman, *Croat* 15408 (MO, NY); Margarita Swamp, *Cook & Martin* 5 (US); Frijoles, *Cook & Martin* 65 (US); Agua Salud, *Cook & Martin* 68 (US). **Colón:** Santa Rita Ridge, 9°20'N, 79°47'W, 200 m, *Churchill* 5564 (MO). **Darién:** Parque Nacional del Darién, Estación Rancho Frío at N base of Cerro Pirre, ca 9 km S of El Real, along

Quebrada Perisenico, 8°01'N, 77°44'W, 70–270 m, *de Nevers et al.* 8242 (CAS). **Panamá:** Cerro Azul, *Croat* 17279 (MO); 4.5 km N of Lago Cerro Azul, vicinity of Finca Vega, 675 m, *Nee* 7020 (MO, WIS). San Blas: El Llano-Cartí road, km 19.1, 9°19'N, 78°55'W, 200 m, *de Nevers et al.* 4464 (MO, NY), *Mori & Kallunki* 5547 (MO), km 26.5, along Río Cartí Chico, 9°19'N, 78°55'W, 200 m, *de Nevers et al.* 5343 (MO, NY, PMA); Cangandí, 30 m, *Herrera* 166 (CAS, MO); Miria Ubigandup, 9°26'N, 78°56'W, 20 m, *Herrera & Pérez* 304 (CAS).

DISTRIBUTION AND HABITAT. — Eastern Panama (Canal Area, Colón, Darién, Panamá, San Blas), northwestern Colombia (Antioquia, Chocó) and Amazonian Peru (Amazonas); tropical wet forest at elevations below 700 m.

LOCAL NAMES AND USES. — Panama: *sig-nugar* (Kuna, literally translated “peccary teeth”), *sadu wala* (Kuna); *uvita*, *uvito*, *caña brava* (Spanish). The Kuna make a comb from the stem which is used medicinally to augment intelligence. *Kwi*, *dior*, and *maske*, are all general Kuna names for plants of the genus *Bactris*.

DISCUSSION. — This species is characterized by its large size, open habit of growth, subequal fruiting calyx and corolla, and hairy fruits which are widest at the middle. We have seen only leaves of the type. *Nee* 7020 has the subequal fruiting calyx and corolla and bristly fruits of *B. coloniata* and the plicate leaves of *B. kunorum*, and pinnae with numerous 1–3 mm long, black, marginal spines.

5. *Bactris coloradonis* L. H. Bailey, Gentes Herb. 3:104. 15 Mar 1933.

TYPE. — PANAMA. **Canal Area:** Barro Colorado Island, 6 Jul 1931, L. & Z. Bailey 502 (lectotype, BH [here designated]).

Bactris porschiana Burret in Cufod., Ann. Naturhist. Mus. Wien 46:229. Jul 1933.

TYPE. — COSTA RICA. Limón: Río Reventazón, La Castilla-Los Negritos, 3 Apr 1930, G. Cufodontis 724 (holotype, B, destroyed; F negs. 30905, 30906).

NEOTYPE. — COSTA RICA. Limón: Dist. Guácimo, between Guácimo and Santa Rosa, 19 Jun 1991, Mattos 2892 (NY, here designated).

Stems cespitose or solitary, 1.5–10 m tall, 3–8 cm diam, with spines on the internodes. Leaves 2–6; sheath 43–60 (–100) cm long, sheath, petiole (and rachis) usually white, woolly-tomen-

tose, densely to moderately covered with terete, black spines to 8.5 cm long; rachis 0.9–2.1 m long, normally without spines; pinnae 17–38 (~80) cm long (or the leaves rarely simple), irregularly arranged in clusters, spreading in the same or in various planes, linear-lanceolate, aristate, glabrous, the middle ones 21–86 cm long, 3–7 cm wide, usually spiny on the margins, usually with obvious cross-veins. Inflorescences interfoliar; peduncle 9.5–23 cm long, recurved, flattened; prophyll 9–23 cm long; peduncular bract 27–37 cm long, sparsely to densely covered with spreading, terete, black or brown spines to 1 cm long; rachis 3.5–9 cm long; rachillae 20–51, 14–29 cm long, with long, brown hairs; triads irregularly arranged amongst paired or solitary staminate flowers; staminate flowers 3 mm long (immature); sepals connate below, free above, 2 mm long; petals connate below for ca. half their length, free and valvate above, 3 mm long; pistillate flowers 2.5 mm long (immature); calyx tubular, 1 mm long; corolla tubular, 2 mm long; staminodes 6, mi-nute; fruits very widely obovoid, briefly rostrate, to 1.5 (~2.5) cm long, 1.4–1.5 (~2) cm diam, orange-red, smooth; mesocarp mealy, fibrous; endocarp turbinate; endocarp with few fibers, without juice sacs; endocarp pores equidistant; fruiting perianth with calyx less than 1 mm long, obscure, and corolla 4–5 mm long, truncate or with slightly undulate margins.

ADDITIONAL SPECIMENS EXAMINED.—COSTA RICA. Heredia: Finca La Selva, Río Sarapiquí, *Hammel* 8345 (MO), *Holdridge* 5121 (BH), *Moore & Hartshorn* 10123 (BH), *Moore & Dransfield* 10233 (BH), Finca El Bejucos, *Henderson* 63 (NY). Limón: 14 airline km SW of Barra del Colorado, 83°40'W, 10°40'N, 10–120 m, *Davidse & Herrera* 31101 (MO); 7 km S of Bribri, 100–250 m, *Gómez et al.* 20453 (MO); Dist. de Los Angeles de Jiménez, Finca Copasa, *Mattos* 2891 (NY); Tortuguero, 70 m, *Robles* 1604 (MO), *Robles* 1198 (MO); Cerro Coronel, 10–40 m, *Stevens* 24350 (MO).

PANAMA. Canal Area: Mojinga swamp, *Bartlett* 16873 (MICH); Balboa, *Cook & Martin* 6 (F); Barro Colorado Island, *Croat* 10946 (MO, SCZ), 10947 (MO), 11322 (MO); road S-10 N of Escobal, *Croat & Porter* 12478 (MO, PMA); near Coco Solo weather station, *Duke* 4269 (MO); Río Chinilla, *Maxon* 6904 (US), 6908 (US), *Cook & Martin* 21 (US); Fort Sherman, *Mori & Kallunki* 3664 (F, MO); Loma La Toba, 3 km SW of mouth of Río Chagres, *Nee* 8933 (MO, PMA, US); Gatuncillo, *Smith et al.* 3335 (US). Coclé:

Atlantic slope 9.4 km above El Copé, 750–900 m, *Croat* 44663 (MO), 8°38'N, 80°39'W, 650–750 m, *de Nevers et al.* 6374 (MO, PMA), 700–850 m, *Folsom et al.* 5746 (MO), 3000 ft., *Hammel* 2628 (MO), *Read et al.* 81-25 (US); Coccito road, trail along continental divide, 8°42'N, 80°28'W, 500 m, *de Nevers et al.* 6731 (MO); El Valle, Cerro Gaital, 8°37'N, 80°07'W, 800–900 m, *McPherson* 11198 (CAS, MO), *Mori & Kallunki* 2969 (MO). Colón: N of Diamante, NW of abandoned mine on Quebrada de la Mina, 9°24'N, 79°35'W, *Churchill & de Nevers* 4223 (MO); Santa Rita Ridge, ca. 1 mi. from Boyd-Roosevelt Highway, *Croat* 15322 (MO), 9°25'N, 79°40'W, 500 m, *McPherson* 11752 (MO), *Porter et al.* 4730 (BH, MO); end of Río Boquerón road, 1500–2000 ft., *Hammel* 2464 (MO). Darién: Cerro Pirre, 700–950 m, *Mori & Kallunki* 5505 (MO). Panamá: Cerro Jefe, *Davidse & D'Arcy* 10120 (MO), *Lewis et al.* 263 (BH, MO), 2900 ft., *Gentry et al.* 3451 (MO, PMA); *Busey & Croat* 257 (MO), *Croat* 11550 (MO), *Read et al.* 81-42b (US); El Llano-Cartí road km 14, 350–400 m, *Correa A. et al.* 1839 (MO, PMA), *Folsom et al.* 6160 (MO), km 22.3, 350 m, *Mori & Kallunki* 5103 (MO, PMA); Cerro Campana, 1000 m, *Croat* 22838 (MO), *Porter et al.* 4209 (MO); El Llano, Río Mamoni, *Duke* 5612 (MO); Pipeline road, *Gentry & Hamilton* 41119 (MO, NY). San Blas: El Llano-Cartí road, km 26.5, along Río Cartí Chico, 9°19'N, 78°55'W, 200 m, *de Nevers et al.* 5351 (CAS, MO, NY), *Henderson & Herrera* 716 (BH, CAS, NY), km 19.1, 350 m, *de Nevers et al.* 6216 (MO, PMA), *de Nevers et al.* 7314 (MO); Yar Bired (Cerro San José), 9°20'N, 79°08'W, 400–500 m, *de Nevers & Herrera* 6946 (MO); Cangandí, 9°24'N, 79°24'W, 30 m, *de Nevers & Herrera* 7077 (MO), *de Nevers et al.* 7549 (MO); 50 m, *Herrera & Pérez* 126 (CAS, PMA); Aila Tiwar (Río Acla), 8°48'30"N, 77°40'30"W, 25–100 m, *Mabberley & Sugden* 1852 (MO). Veraguas: Santa Fe, 8°31'N, 81°08'W, 700 m, *Churchill et al.* 5965 (MO), 700–1200 m, *Liesner* 999 (MO), *Croat & Folsom* 33910 (MO), *de Nevers et al.* 10555 (CAS, NY); mouth of Río Concepción, *Lewis et al.* 2815 (MO);

DISTRIBUTION AND HABITAT.—Costa Rica (Heredia, Limón), Panama (Canal Area, Coclé, Colón, Darién, Panamá, San Blas, Veraguas), western Colombia (Antioquia, Chocó, Nariño, Valle), and western Ecuador (Esmeraldas); lowland or premontane rainforest below 900 m elevation.

LOCAL NAMES AND USES.—Nicaragua: *coyolito*. Panama: *arar, sin nuar* (Kuna).

DISCUSSION.—*Bactris coloradonis* is distinguished from related species by its longer rachillae with larger fruits. Panamanian material

usually has prominent cross-veins and marginal setae on the pinnae; that from Costa Rica usually does not. However, this variation is not consistent, and flowers and fruits from both countries are identical. One specimen from near La Selva, at Finca El Bejuco (*Henderson* 63) is unusual. It is large and superficially resembles *Bactris coloradonis*, but has the fruiting calyx and corolla like those of *B. major*. *Gómez et al.* 20453, from extreme southeastern Costa Rica, agrees well with *B. coloradonis*, but has unusually large fruits (2.5 × 2 cm).

Bactris coloradonis, as here circumscribed, is a variable species, with several more or less geographically distinct races that may ultimately be found deserving of taxonomic recognition. We currently distinguish four such entities, including typical *B. coloradonis*, widespread in the Panamanian lowlands. Costa Rican material, for which the name *B. porschiana* Burret is available, differs from the typical "race" in having less formidably spiny leaves without conspicuous cross-veins, as well as somewhat smaller, more globose, and less prominently rostrate fruits. Panamanian specimens from higher elevations in the provinces of Coclé (El Copé) and Veraguas (Santa Fe region) tend to have proportionately broader and more conspicuously caudate-tipped pinnae than material from the adjacent lowlands, as well as shorter rachillae and larger, more prominently rostrate fruits. A specimen from Coclé (*de Nevers et al.* 6731) is unique in having simple leaves. These Panamanian upland collections seem to approach *B. dianeura*, another mid-elevation species, especially in their fruits. *Mabberley & Sugden* 1852, from the Comarca de San Blas, Panama, is the sole Mesoamerican collection of a "race" which, judging from herbarium material, ranges through the Pacific lowlands of Colombia south to the Bajo Calima region of the Department of Valle. This material is characterized by very densely white-tomentose petioles and leaf rachises, inconspicuous cross-veins in the pinnae, and densely spinulose rachillae. The distinctive rachilla spinules are black, somewhat contorted and to ca. 3 mm long. This last "race" may occur sympatrically with typical *B. coloradonis*, and may even merit specific status. Additional collections are necessary to resolve the issue.

6. *Bactris dianeura* Burret, Repert. Spec. Nov. Regni Veg. 34:217. 1934.

TYPE. — NICARAGUA. Matagalpa: Camino Real de Casica, 850 m, 8 Aug 1893, *E. Rothschild* 237 (holotype, B, destroyed).

NEOTYPE. — COSTA RICA. Alajuela: Monteverde Cloud Forest Nature Reserve, 9°17'N, 84°86'[sic]W, 1250–1350 m, *Burger et al.* 10753 (F, isoneotype MO, here designated).

Stems cespitose, forming small colonies of 2–8 stems, 2–5 (–10) m tall, 1–3 cm diam, the internodes with spines to 2.8 cm long. Leaves 5–7; sheath 17–45 or more cm long, sheath and petiole densely black- or ± reddish spiny, with spines to 6.5 cm long; petiole 26–80 cm long; rachis 58–90 (–125) cm long, with few spines to ca. 7.5 cm long; pinnae 14–20 per side, irregularly arranged in clusters of 2–3, lanceolate to oblanceolate, the middle ones 26–44 (–56) cm long, (1.4–) 2.7–4.5 (–6.3) cm wide, obscurely to clearly cross-veined, setose marginally (the setae to ca. 6 mm long). Inflorescences interfoliar; peduncle 6–12.5 cm long, tightly curved in fruit, with fine spines to ca. 1 cm long; prophyll 10–11 cm long; peduncular bract to at least 26 cm long, densely covered with stramineous to blackish spines to 2 cm long, inserted 0.5–3 cm above base of peduncle, rarely subbasal; rachis 1.6–3.4 cm long; rachillae 7–17, 4.3–11 cm long, 1–1.5 mm wide; triads irregularly arranged on proximal two thirds of rachillae; staminate flowers 3–4 mm long; calyx 1–1.5 mm long, hyaline, divided nearly to the base, the lobes narrowly lanceolate or subulate; pistillate flowers 3.5–5.5 mm long; calyx 1–2 mm long, shallowly cupiform, acutely 3-lobed, striate, glabrous; corolla 3–5 mm long, campanulate to tubular, acutely 3-lobed to about halfway (lobes sometimes with subsidiary teeth); staminodes 1–3, scutellate, extremely minute; fruits subglobose or usually obovoid, prominently rostrate, 1.2–1.8 cm long, 1.2–1.6 cm diam, bright orange, glabrous, striate; mesocarp very thin, mealy; endocarp turbinate; endocarp not pitted, fibers few or lacking; endocarp pores equidistant; fruiting calyx minute; corolla 2–3 mm long, irregularly split at apex by enlarging fruit, without visible staminodia.

ADDITIONAL SPECIMENS EXAMINED. — COSTA RICA. Alajuela: Monteverde Cloud Forest Nature

Reserve, 10°18'N, 84°47'W, 1450–1650 m, *Burger & Baker* 9646 (F); Reserva Biológica de San Ramón, 10°04'N, 84°32'W, 850–1100 m, *de Nevers et al.* 7794 (MO); Montes del Aguacate, 10°02'N, 84°28'W, *Grayum et al.* 9103 (MO). Cartago: 0.8 km W of Tapantí, *Lent* 971 (F); S of Muñeco, *Utley & Utley* 767 (F, MO). Guanacaste: Monteverde Cloud Forest Nature Reserve, 10°18'N, 84°50'W, *Gentry et al.* 71590 (MO). Heredia: 5.5 km N of Vara Blanca, 1200 m, *Croat* 36054 (MO); Volcán Barva, Río San Rafael, 10°13'N, 84°05'W, 1500 m, *Grayum* 7028 (CR, MO); Reserva Forestal de San Ramón, 600–800 m, *Sánchez s.n.* (CR). Limón: between Río Pacuare and Grano de Oro, 7 km below Hacienda Moravia, *Moore & Córdoba* 6700 (BH). Puntarenas: Monteverde, 10°17'N, 84°50'W, *Dryer* 1415 (F), 1450–1550 m, *Gentry & Haber* 48776 (MO), 1400 m, *Haber ex Bello & Lierheimer* 4670 (MO), 1500 m, *Hammel* 13865 (MO). San José: La Palma, 1520 m, *Pittier* 396 (BR).

PANAMA. Chiriquí: 7.2 mi. beyond Los Planes de Hornito, 8°44'N, 82°14'W, 1165–1200 m, *Croat* 67824 (CAS); *de Nevers* 8747 (CAS). Veraguas: Santa Fe, *de Nevers et al.* 8986 (CAS).

DISTRIBUTION AND HABITAT. — Nicaragua (Matagalpa), Costa Rica (Alajuela, Cartago, Guanacaste, Heredia, Limón, Puntarenas, San José) and Panama (Chiriquí, Veraguas); premontane rainforest between 600 and 1650 m elevation.

DISCUSSION. — This species is similar to *Bactris mexicana*, but the sheath, petiole and rachis are minutely spinulose, the rachillae are fewer, and the fruits are rostrate. It also occurs at higher elevations.

Our application of the name *Bactris dianeura* Burret to this species demands some explanation, as no original material or illustration is extant, and we have seen no specimens from Nicaragua, where the type was collected. In the first place, Burret's lengthy description agrees quite well with the material cited above, especially in terms of relatively small stature, extreme spininess ("ganze Pflanze sehr stachelig") with the spines often pale colored and black-tipped ("stramineis, superne atris"), and prominent cross-veins on the adaxial laminar surface. Furthermore, the type locality at 850 m in Matagalpa Department is in a "cloud-forest" habitat (W. Stevens, pers. comm.), and this is the only cloud-forest *Bactris* species we are aware of in the Mesoamerican region. In any case, we have seen no collections of any other *Bactris* species from Matagalpa

Department. Thus, the evidence presently available strongly suggests that *Bactris dianeura* represents the species here circumscribed.

7. *Bactris gasipaes* Kunth, in Humb., Bonpl. & Kunth, Nov. gen. sp. 1:302. 1816. nom. cons. *Guilielma gasipaes* (Kunth) L. H. Bailey, Gentes Herb. 2: 187. 1930.

TYPE. — COLOMBIA. Tolima: Ibagué, n.d., *A. Bonpland* s.n. (holotype, P; F neg. 38701).

Martinezia ciliata Ruiz & Pav., Syst. veg. fl. peruv. chil. 295. 1798. *Bactris ciliata* (Ruiz & Pav.) Mart., Hist. nat. palm. 2:95, t. 71, fig. 3. 1826.

TYPE. — PERU. Huánuco: "in nemoribus Pozuzo, Cuchero, Chanchamayo et Huayabal," *Pavon* s.n. (holotype, MA, n.v., isotypes, BM, n.v., M, n.v.).

Guilielma utilis Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjöbenhavn 1858:46. 1859. *Bactris utilis* (Oerst.) Benth. & Hook. f. ex Hemsl., Biol. centr.-amer., Bot. 3:413. 1885.

TYPE. — COSTA RICA. Without locality, n.d., *A. Oersted* s.n. (holotype, C?, n.v.).

Stems cespitose or solitary, 4–15 m tall, 8–14 cm diam, spiny at internodes, rarely without spines. Leaves 9–20; sheath lacking an ocrea; sheath and petiole 1–1.1 m long, sheath, petiole and rachis moderately to densely covered with black or brownish spines to 1 cm long, these in three lines on the abaxial surface of sheath and petiole; rachis 1.9–2.6 m long; pinnae 92–123 per side, arranged in obscure clusters of 3–5, spreading in several planes, linear, 52–75 cm long, 2–3 cm wide, unequally bifid with midrib terminating subapically. Inflorescences at first interfoliar; peduncle 20–28 cm long, gently recurved, non-spiny; prophyll 20–21 cm long; peduncular bract 47–70 cm long, moderately to densely covered with blackish or brownish spines to 1 cm long; rachis 15–23 cm long; rachillae 46–57, 17–28 cm long; triads irregularly arranged amongst paired or solitary staminate flowers; staminate flowers to 4 mm long, deciduous; sepals 2 mm long, united into a spreading, triangular calyx; petals united for ca. one-third their length, free and valvate above, obovate, 3.5 mm long; pistillate flowers 6 mm long; calyx 2 mm long; corolla 4.5 mm long; staminodes absent; fruits widely ovoid, to 5 cm long, to 3 cm diam, yellow, orange or red at

maturity; mesocarp mealy; endocarp ellipsoid; endocarp fibers stout, flattened, adnate to the endocarp; endocarp pores with the sterile pores close together and the fertile pore displaced towards apex; fruiting perianth with very small calyx with undulate margins and much longer, scarcely lobed corolla, staminodial ring absent.

ADDITIONAL SPECIMENS EXAMINED.—HONDURAS. Atlántida: Lancetilla, near Tela, 20–600 m, Standley 55564 (US). COSTA RICA. Heredia: Finca La Selva, Hammel 10045 (MICH), Henderson 43 (NY); Río Hondo, Plains of Santa Clara, 100 m, Cook & Doyle 342 (US); 634 (US).

PANAMA. Canal Area: Barro Colorado Island, Croat 11798a (MO), 14479 (MO, SCZ), 14497 (MO); Juan Minas, Chagres River, Doyle 7 (US); Las Cascadas, 11 April 1925, Cook s.n. (US); end of Pipeline road, 19 km W of Gamboa, 25–50 m, Nee & Smith 11063 (MO). Darién: near camp Pico Pendejo and also upstream on the Río Sabana from Santa Fe, Duke 14075 (MO, PMA). San Blas: Cangandí, 30 m, 9°24'N, 79°24'W, de Nevers et al. 7469 (MO).

DISTRIBUTION AND HABITAT.—Widely and commonly cultivated throughout tropical areas of Central and northern South America, almost always associated with current or past human dwellings. There are many cultivated varieties, including one without spines on the stems and leaves, and another with seedless fruits. Its place of origin is not known, but the wild ancestor is probably *B. macana* (Mart.) Pittier from the Andean region of Colombia and Venezuela and the southwestern Amazon region in Peru, Brazil and Bolivia.

LOCAL NAMES AND USES.—Costa Rica: *pejibaye*, *pejivalle*. Panama: *nalup*, (Kuna). The fruits of *Bactris gasipaes* are an important food item in many parts of Central America, for example the Kuna of Panama. Although we have observed spineless clones in Cangandí these are not favored nor propagated preferentially by the Kuna. The Kuna use the fallen fruits as bait in hunting (Ventocilla 1992:107), and the trunks in construction (Castillo & Beer 1983). Currently agriculturalists are working to improve yields in this species, and are promoting its use as a source of palm hearts (e.g., Clement & Mora Urpí, 1987).

DISCUSSION.—This species is characterized by its tall, thick stems, sheath without ocrea,

petiole spines in three lines, and endocarp fibers flattened and adnate to the endocarp.

Bernal (1989) proposed conservation of *Bactris gasipaes* over the earlier name, *B. ciliata* (Ruiz & Pav.) Mart., and his proposal has been accepted (Brummitt, 1993).

8. *Bactris glandulosa* Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjöbenhavn 1858:184. 1859. *Bactris bifida* Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjöbenhavn 1858:44. 1859, non Mart. (1826). *Bactris oerstediana* Trail, J. Bot. 15:43. 1877, nom. superfl.

TYPE.—COSTA RICA. Puntarenas: Puntarenas, n.d., A. Oersted 6536 (inflorescence only).

LECTOYPE.—C (here designated), F neg. 21108.

Stems cespitose or solitary, 1.5–5 m tall, 2–4.5 cm diam, spiny. Leaves 4–6; sheath 26–86 cm long, sheath and petiole sparingly armed with round, black or yellowish spines to 5 cm long; petiole 16–80 cm long; rachis 1–1.7 m long; pinnae 16–29 per side (or occasionally leaf simple), linear to narrowly elliptic, without prominent cross-veins, both surfaces (or sometimes only abaxially) bearing a fine, short, golden pubescence, irregularly arranged in clusters of 2–7 and spreading in different planes, middle pinnae 30–60 cm long, 3–7 cm wide. Inflorescences interfoliar; peduncle 8–13 cm long, recurved, spinulose; prophyll 8–16 cm; peduncular bract 15–30 cm long, densely hirsute with fine, soft to stiff, black spines and golden hairs; rachis 3–6 cm long; rachillae (24–) 40–50, crowded, slender, 5–11 cm long, densely glandular; triads regularly arranged on proximal part of rachillae, staminate paired or solitary distally; staminate flowers 3.5–4 mm long, usually along only one side of the rachillae, usually persistent in fruit; sepals connate into a shallow, 3-lobed cupule, 1 mm long; petals connate below for ca. half their length, free and valvate above, 3.5–4 mm long; anthers exserted laterally from petals at anthesis; pistillate flowers 3 mm long; calyx 1 mm long, glabrous; corolla 3 mm long, usually pubescent with soft, thin, wavy spines to 1 mm long, occasionally glandular, rarely glabrescent, minutely 3-toothed; staminodia absent; fruits globose, 0.5–1.6 cm diam, red, glabrous, striate, with abrupt stigmatic residue; mesocarp mealy; endocarp fibers absent; endocarp turbinate, black or

white, the pores ± equidistant or displaced, all at same latitude; fruiting calyx minute, corolla 2 mm, irregularly parted.

DISTRIBUTION AND HABITAT.—Costa Rica (Cartago, Heredia, Limón, Puntarenas, San José), Panama (Bocas Del Toro, Canal Area, Chiriquí, Coclé, San Blas, Veraguas) and Colombia (Antioquia, Chocó); tropical wet forest below 1000 m elevation.

DISCUSSION.—Oersted (1859:44) originally called this species *Bactris bifida*, but between the time he submitted his manuscript and the date it was printed he became aware that the name was preoccupied by *Bactris bifida* Mart. (Hist. Nat. Palm. 2:105, t. 73C fig. 3, 1826.). He corrected his mistake on page 184 of the same volume, substituting the name *B. glandulosa* for *B. bifida*. In 1863 Oersted illustrated *B. glandulosa*, referring to its original publication in his paper of 1859. In neither publication did Oersted cite a specimen. Trail (1877) understandably overlooked Oersted's correction.

Neither Dahlgren (1936) nor Burret (1933–34) nor Glassman (1972) lectotypified the name *B. bifida* Oerst. Oersted 6536 consists of an inflorescence and part of a leaf. The leaf apparently belongs to *B. gasipaes* (and may be part of the original, now missing, type of *Guilielma utilis*). The inflorescence alone is here lectotypified as *B. glandulosa*, and matches perfectly Oersted's (1863) plate of that species.

Two subtaxa of this species occur, almost always together, and some intermediates are found. Here we recognize these two subtaxa as varieties.

Key to the varieties of *B. glandulosa*

1. Petiole and rachis not or sparsely spiny; pinnae densely pilose abaxially; pistillate corolla with long, contorted setae.....

.....8a. *B. glandulosa* var. *glandulosa*.

1. Petiole and rachis densely spiny; pinnae sparsely pilose abaxially, mainly along veins; pistillate corolla glabrous or minutely spinulose.....8b. *B. glandulosa* var. *baileyana*.

8a. *Bactris glandulosa* var. *glandulosa*

Fig. 2.

Bactris fusca Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjöbenhavn 1858:43. 1859.

TYPE.—COSTA RICA. Cartago: Turrialba, 1845–48, A. Oersted 6535 (excluding inflorescence).

LECTOTYPE.—C, n.v. (here designated); F neg. 21107.

Bactris alleniana L. H. Bailey, Gentes Herb. 6:228. 1943.

TYPE.—PANAMA. Coclé: El Valle de Antón, 700 m, 2 Jul 1942, P. Allen 2574 (holotype, BH; isotype, MO).

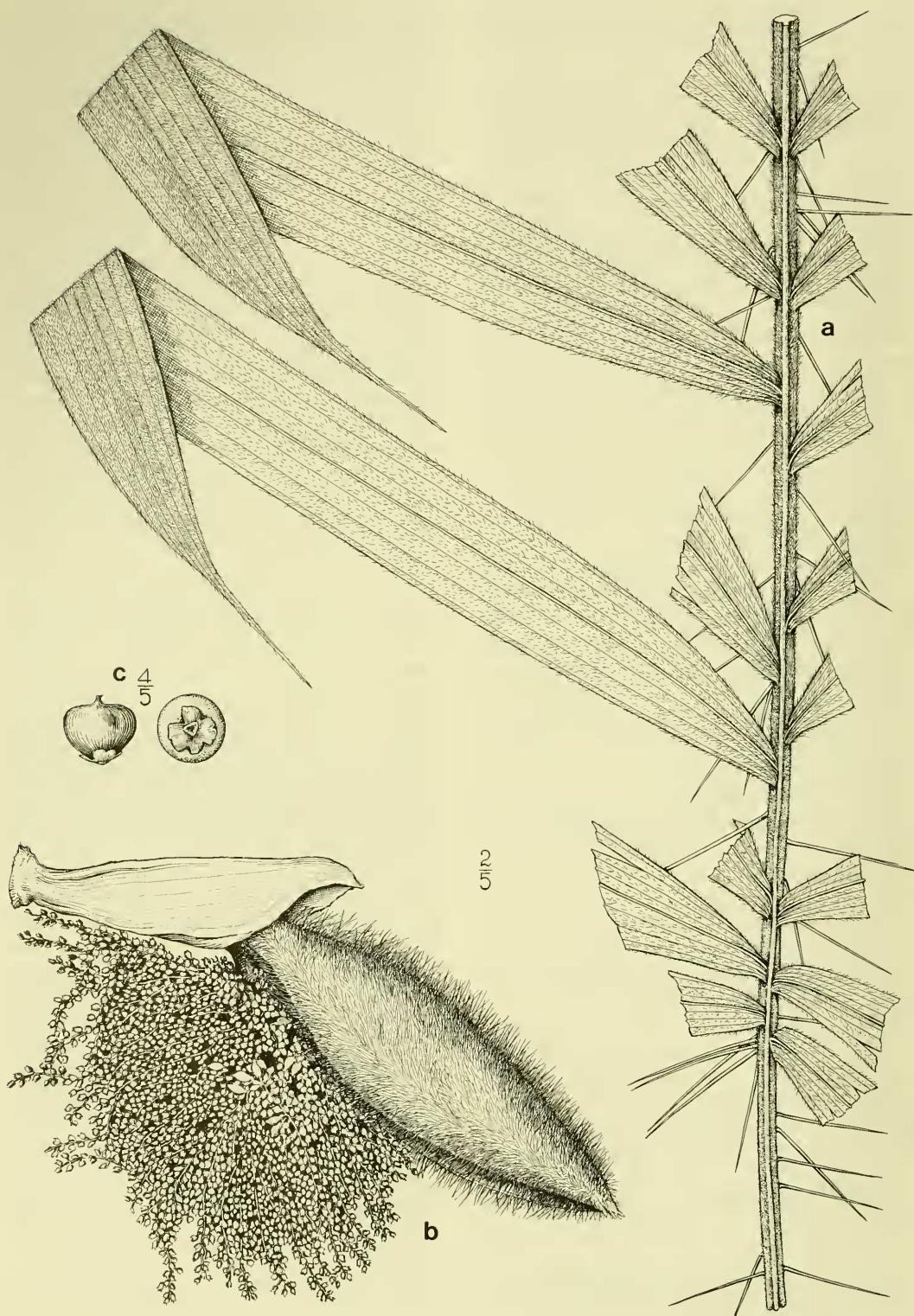
ADDITIONAL SPECIMENS EXAMINED.—COSTA RICA. Cartago: Juan Viñas, Cook & Doyle 219 (US). Turrialba, 9°53'N, 83°39'W, 560–600 m, Grayum 8476 (MO), Read & Daniels 74-58 (US). Limón: Cairo, Loomis 9 (US). Puntarenas: 5 km W of Rincón de Osa, 8°42'N, 83°31'W, Burger & Liesner 7297 (F) Sirena Field Station, Corcovado National Park, Osa Peninsula, 8°30'N, 83°35'W, Gentry 48498 (MO); Gentry 48535 (MO); Golfito, Fila Gamba, 8°35'N, 83°12'W, 140–180 m, Grayum & Herrera 9137 (MO), Grayum & Herrera 9235 (MO); ca. 15 km W of Rincón, 8°42'N, 83°33'W, Henderson et al. 1812 (NY); ca. 5 km W of Rincón, 8°42'N, 83°31'W, Henderson et al. 1819 (NY), Henderson et al. 1820 (NY), Henderson et al. 1824 (NY); Rincón de Osa, 20–300 m, Liesner 2090 (MO). San José: Reserva Biológica Carara, Río Carara, 9°47'N, 84°32'W, 130–170 m, Grayum 10441 (MO).

PANAMA. Bocas Del Toro: hill above RR station at Milla 7.5, Croat & Porter 16404 (MO). Canal Area: road S-11, NW of Escobal, Croat 12462 (MO). Chiriquí: 1 mi. E of Cañas Gordas near Costa Rican border on road to Volcán, Croat 22303 (MO); Burica Peninsula, 8 mi. W of Puerto Armuelles, 200 m, Croat 22478 (MO, PMA). Coclé: El Valle de Antón, Allen 1804 (BH, MO), Allen 2951 (BH). Colón: Río Guanche, sea level, de Nevers 10703 (CAS). San Blas: Río Taindi (Taimdi of maps) 6 km above confluence with Río Mandinga, 9°25'N, 79°11'W, 30–100 m, de Nevers & Herrera 7645 (MO); trail to Cerro Obu from Río Urgandi (Río Sidra), 9°23'N, 78°48'W, de Nevers et al. 7999 (CAS, MO).

8b. *Bactris glandulosa* var. *baileyana* (H. E. Moore) de Nevers, comb. & stat. nov. *Bactris baileyana* H. E. Moore in L. H. Bailey, Gentes Herb. 8:155. 1949.

TYPE.—PANAMA. Chiriquí: Cerro Galera Chorcha, Gualaca, 1000 ft, 1 Aug 1947, P. Allen 5023 (holotype, MO; isotype, BH).

ADDITIONAL SPECIMENS EXAMINED.—COSTA RICA. Cartago: Tucurrique, Turrialba, 820 m, Mat-



tos et al. 2895 (NY). **Limón:** between Punta Manzanillo and Punta Mona, 9°38'N, 82°38'W, *Grayum & Schatz* 5254 (MO); Colonia Maceo, *Cook & Doyle* 739 (US). **Puntarenas:** Interamerican Highway, km 287, 3 km W of Chacarita, 8°84'N, 83°17'W, *de Nevers et al.* 7754 (MO); Osa Peninsula, Corcovado, *Gentry et al.* 48571 (MO); fila before Rancho Quemado, near Rincón, 8°42'N, 83°33'W, 300 m, *Gentry et al.* 78762 (MO); Osa Peninsula, near Palmar Norte, *Grayum et al.* 9137 (MO); Osa, road to Puerto Jiménez, 100 m, *Gómez P.* 19513 (CAS, MO); Finca El Edén, 400 m E of Santa Marta [Valle de El General], *Gómez* 22953 (MO); Esquinas, ca. 25 km from Palmar Sur on Golfito railroad, *Moore* 6556 (BH); between Las Cruces Botanical Garden and Río Jaba, ca 4 km SE of San Vito de Coto Brus, 8°47'N, 82°58'W, 1150 m, *Grayum et al.* 7575 (MO); 8 km from Chacarita, 8°45'N, 83°18'W, *Henderson et al.* 1806 (NY).

PANAMA. Chiriquí: Progreso, *Cooper & Slater* 189 (US). Veraguas: mountains of southern Azuero Peninsula, ca 10 km SW of El Cortejo, El Pavo ridge above river Los Changuales, 1500–2000 ft, *Hammel* 5438 (MO); Cerro Alto Higo, 2000–3000 ft, *Hammel* 4316.

DISCUSSION. — The question of priority must be carefully considered with regard to the binomials *Bactris fusca* and *B. glandulosa*, published by Oersted in the same volume of the Danish journal *Videnskabelige Meddelelser fra den naturhistoriske forening i Kjöbenhavn*, and here treated as synonyms. The unnumbered volume comprises papers presented in 1858, but was published in 1859. It is divided into three sections, as follows: "Nr. 1–4" (pp. 1–64), "Nr. 5–7" (pp. 65–128), and "Nr. 8–11" (pp. 129–184). *Bactris fusca* and *B. bifida* Oerst., the basionym of *B. glandulosa*, were published on pp. 43 and 44, respectively, of the first section, while *B. glandulosa* (a nomen novum for *B. bifida*) appeared on the very last page of the final section. If it could be established that the three separate sections were issued sequentially at different times, then the name *Bactris fusca* would have to be used for this species as having priority over *B. glandulosa*; however, if the entire volume had been issued at once, then either name could be

chosen (provided no precedent existed for preferring one name over the other).

Unfortunately we can find no wording anywhere in the volume that definitely clears up this problem. However, based on indirect evidence, we believe that the entire volume appeared as a single unit in 1859 (the date of publication given on the title page). The volume was reviewed (apparently by F. L. von Schlechtendal) in *Botanische Zeitung* Vol. 18, beginning with Oersted's paper on Central American palms, dealt with on pp. 46–47 of issue No. 5, which appeared on 3 February 1860. This portion of the review terminated with the words "Beschluss folgt" ("Conclusion follows"), marking it as a single, if interrupted, piece which was completed in issue No. 6 (pp. 54–55), published on 10 February 1860, beginning with the heading "Beschluss" ("Conclusion"). Three additional articles were reviewed in issue No. 6, including one from section "Nr. 8–11." Thus it seems virtually certain that the 1858 volume of the journal containing Oersted's paper was published all at once, probably in late 1859; otherwise, a weekly publication such as *Botanische Zeitung* would surely have reviewed the sections separately. Unfortunately, the detailed review of Oersted's paper does not mention *Bactris glandulosa*, which would have clinched the matter; however, that item would have been easily overlooked.

We conclude, therefore, that priority of initial publication is not a factor in selecting between the names *Bactris fusca* and *Bactris glandulosa*. In the case of names published simultaneously, priority is established according to the earliest publication in which said names were treated as synonyms. Although this can be extremely difficult to determine, we feel relatively certain that *Bactris fusca* and *B. glandulosa* have never been previously treated as synonyms, and that our present action in preferring *B. glandulosa* establishes a precedent in this regard. We select *Bactris glandulosa*, since the element chosen to lectotypify that binomial is that which most unequivocally belongs to the species we are dealing with. *Bactris fusca* is a very uncertain entity,



FIGURE 2. *Bactris glandulosa* var. *glandulosa* (Allen 2574). A. Midsection of leaf rachis ($\times 2/5$). B. Inflorescence ($\times 2/5$). C. Fruit in two views. Courtesy of the L. H. Bailey Hortorium, Cornell University.

assigned here only on the basis of a very poorly preserved leaf fragment.

9. *Bactris gracilior* Burret, Repert. Spec. Nov. Regni Veg. 34:216. 1934.

Fig. 3

TYPE. — COSTA RICA. Alajuela: San Carlos, Koschny (holotype, B, destroyed).

NEOTYPE. — COSTA RICA. Alajuela: Finca Vera Cruz, Pital de San Carlos, 60 m, 7 Apr 1990, J. Sánchez s.n. (CR [here designated]).

Bactris aureodrupa L. H. Bailey, Gentes Herb. 6:232. 1943.

TYPE. — PANAMA. Coclé: El Valle de Antón, 1000 m, 23 Jun 1940, P. Allen 2150 (holotype, BH).

Stems cespitose, 2–4 m tall, ca. 2 cm diam, spiny on internodes. Leaves 5–9; sheath to 28 cm long, moderately to densely covered with short, black spines; petiole 0.2–1.1 m long, without spines; rachis 42–96 cm long, without spines; pinnae 10–24 per side, irregularly arranged in clusters on alternating sides of the rachis distally, more regularly arranged apically, spreading in different planes, narrowly elliptical, gradually aristate, glabrous, middle pinnae 18–39 (–45) cm long, 2.5–4.4 cm wide, dull green adaxially, brownish abaxially on drying, sometimes with minute, forward pointing marginal spines. Inflorescences interfoliar, peduncle 6–10 cm long, not spiny or sparsely appressed-spiny, curved; prophyll 8–12 cm long, thin, chartaceous; peduncular bract 15–24 cm long, sparsely covered with short, black or brown spines, occasionally almost glabrous; rachis 3–3.6 cm long; rachillae 8–23, 7–10 cm long; triads irregularly arranged amongst paired or solitary staminate flowers; staminate flowers 3 mm long; sepals very briefly connate below, spreading above, 1 mm long; petals connate below for ca. half their length, free and valvate above, 3 mm long; pistillode absent; pistillate flowers 3 mm long; calyx 1 mm long; corolla 3 mm long; staminodes minute; fruits ovoid, bluntly rostrate, 1–1.3 cm long, 0.9–1.1 cm diam, orange, glabrous;

mesocarp mealy, fibrous; endocarp turbinate; endocarp not pitted, with a few, flattened fibers; endocarp pores equidistant; fruiting perianth with a minute, 1 mm long calyx and truncate, 3 mm long corolla.

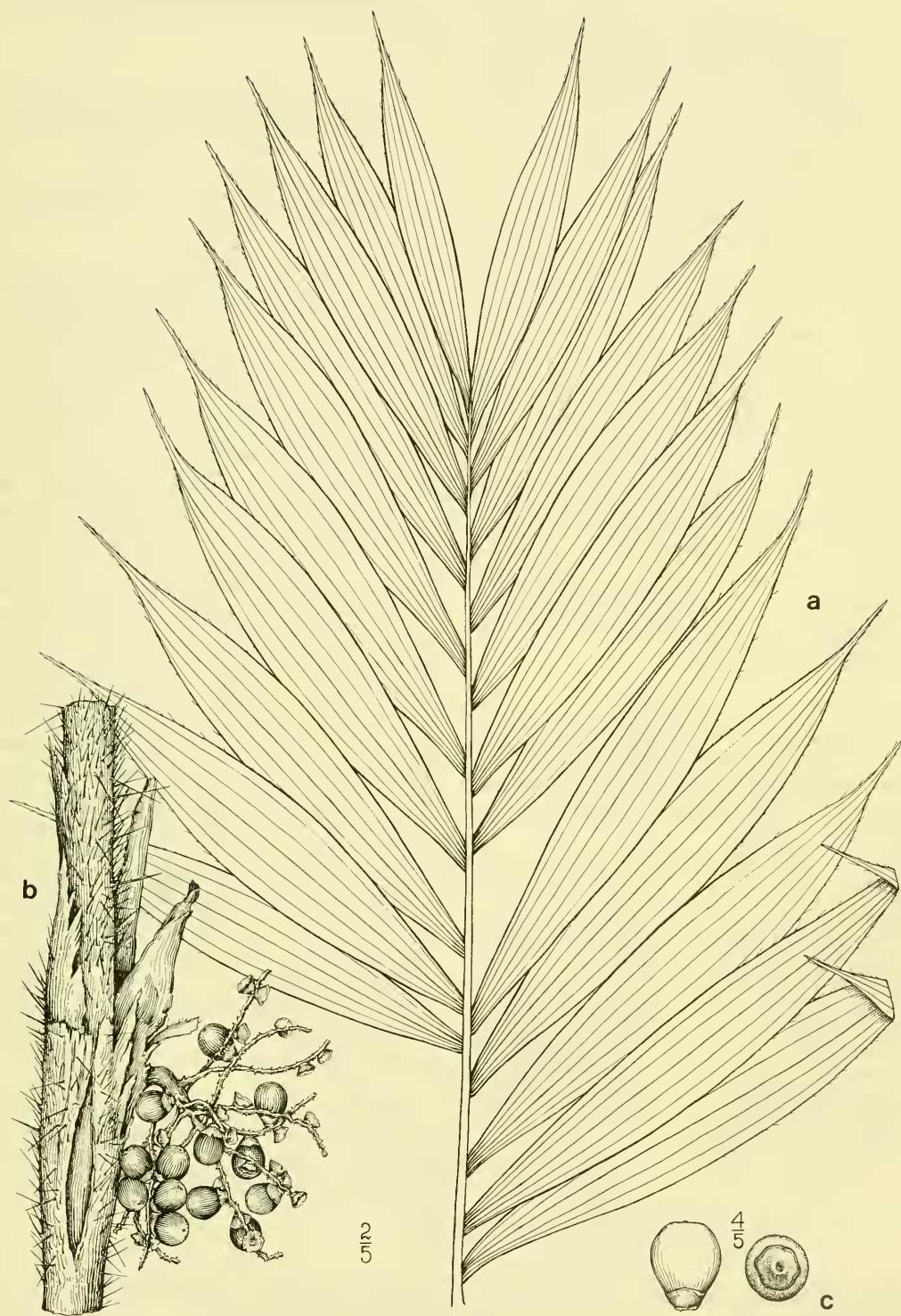
ADDITIONAL SPECIMENS EXAMINED. — NICARAGUA. Zelaya: Bluefields, Cerro El Panteón, 12°S, 83°46'W, 60–100 m, Moreno 14585 (MO); Caño Costa Riquita, ca. 1.8 km SW of Colonia Naciones Unidas, ca. 11°43'N, 84°18'W, 150–180 m, Stevens 5083 (NY); along Río Rama above Rápido Machuca, ca. 11°56'N, 84°16'W, 10 m, Stevens 8906 (MO).

COSTA RICA. Alajuela: San Carlos, Cook & Doyle 51 (US); between San Lorenzo and Los Angeles de San Ramón, 10°14'S, 84°32'W, ca. 620 m, Burger & T. Antonio 11197 (F); Reserva Biológica de San Ramon, road from Las Lagunas to Colonia Palmareña, 850–1100 m, de Nevers et al. 7794 (MO); San Miguel de Sarapiquí, Wendland 62 (GOET), Wendland 70 (GOET). Cartago: above Turrialba, 800 m, Read & Daniels 74-64 (US). Heredia: 8 km SW of Puerto Viejo on road to San José, 10°26'N, 84°02'W, Burger & G. Matta 4303 (NY, US); N of Puerto Viejo, 10 km down road, then 7–8 km W, Garwood et al., 857 (BM); Río Sarapiquí, Wendland s.n., 1857 (K); La Selva, Río Sarapiquí near Puerto Viejo, 10°26'N, 84°01'W, 100 m, Gentry & Ortiz 78575 (MO); Finca El Bejuco, 6 km W of Puerto Viejo, 10°27'N, 84°04'W, Grayum & Jacobs 5344 (MO), Henderson et al. 60 (NY); between Corazón de Jesús and La Virgen, Moore 6629 (NY). Limón: 7 km SW of Bribrí, 100–250 m, Gómez et al. 20454 (MO, NY); Parque Nacional Tortuguero, 10°26'N, 83°23'W, 80–100 m, Robles 1668 (MO); Cerro Coronel, E of Laguna Danto, 10°41'N, 83°38'W, 20–170 m, Stevens 23685 (MO), Stevens 23707 (MO), Stevens & Montiel 24490 (MO); Cairo, Loomis 2 (US); Port Limón, 0–10 m, Cook & Doyle 426 (US); Río Reventazón below Cairo, 25 m, Standley & Valerio 48944 (US).

PANAMA. Province unknown: May 1928 Cooper s.n. (MO). Bocas Del Toro: Chiriquí Grande near Rambala, 8°45'N, 82°15'W, 250 m, McPherson 11151 (MO), Hart 143 (US). Coclé: Coclecito road, 8°42'N, 80°28'W, 200 m, de Nevers & McPherson 6709 (MO, NY); 27 km N of Penonomé on road to Coclesito, 1500 ft, Hammel 1620 (MO); El Copé, Hammel 2392 (MO). Colón: Santa Rita ridge, ca. 6 mi. from Transisthmian Highway, 800–900 ft., Anto-

FIGURE 3. *Bactris gracilior* (Allen 2150). A. Leaf apex ($\times 2/5$). B. Inflorescence. ($\times 2/5$). C. Fruit in two views. Courtesy of the L. H. Bailey Hortorium, Cornell University.





nio 1786 (MO); 12 mi. from highway, 9°20'N, 79°45'W, 500 m, *McPherson* 10254 (CAS); ridge top leading N from Río Escandaloso towards Cerro Bruja, 1500 ft., *Hammel* 2722 (MO). *Darién*: trail N from Ensenada del Guayabo, 18 km SE Jaqué, *Garwood et al.* 211 (MO). *Panamá*: Rancho Chorro, above Tortí Arriba, 400–700 m, *Folsom et al.* 6655 (MO); Cerro Jefe, *Gentry & Dwyer* 3441 (CAS); 2600 ft., *Hammel* 4864 (MO); just W of El Llano, *Gentry* 5099 (MO); 16 km above Pan-Am Highway on road from El Llano to Cartí-Tupile, 350–400 m, *Kennedy* 2541 (MO); along road between El Llano and Cartí-Tupile, 200–500 m, *Liesner* 1327 (MO). *San Blas*: El Llano-Cartí road, km 19.1, 9°19'N, 78°55'W, 350 m, *de Nevers & Cavagnaro* 4828 (MO); km 27, 9°19'N, 78°55'W, 250 m, *de Nevers & Charnley* 5082 (MO); km 26.5, 9°19'N, 78°55'W, 200 m, *de Nevers et al.* 5267 (MO); km 16, 9°19'N, 78°55'W, *de Nevers* 5976 (MO, NY); km 19.1, *de Nevers et al.* 6168 (MO, NY), *de Nevers et al.* 5626 (MO); km 20, *Paredes et al.* 774 (SCZ); km 22, 9°19'N, 78°55'W, 350 m, *de Nevers & Herrera* 7848 (MO); near Nusagandi, 9°15'N, 79°W, 250–300 m, *McPherson* 11020 (MO); Cangandí, 9°24'N, 79°24'W, 100 m, *de Nevers et al.* 5726 (MO), *de Nevers et al.* 6466 (MO), *de Nevers et al.* 7579 (MO); trail to Cerro Obu (Habu of maps) from Río Urgandi (Río Sidra), 9°23'N, 78°48'W, 100–300 m, *de Nevers et al.* 7978 (MO).

DISTRIBUTION AND HABITAT. — Atlantic slope from southern Nicaragua (Zelaya), Costa Rica (Alajuela, Heredia, Limón) and Panama (Bocas Del Toro, Coclé, Colón, Darién, Panamá, San Blas); lowland rainforest below 800 m elevation.

LOCAL NAMES AND USES. — Costa Rica: *bis-croyol*.

DISCUSSION. — This is the species referred to as “*Bactris* sp nov. fide Moore” by Chazdon (1985, 1987). Several specimens are somewhat aberrant: *Gentry & Dwyer* 3441 and *Robles* 1668 have the typical leaves of the species but have spines on the rachis. Some specimens from Costa Rica and Nicaragua have black, 2–11 mm spines on the nerves abaxially (*Moore* 6629, *Robles* 1668, *Stevens* 5083).

10. *Bactris grayumii* de Nevers & A. Henderson, sp. nov.

Fig. 4

TYPE. — COSTA RICA. Limón: Barra del Colorado, 10°47'N, 83°35'W, 1–5 m, 12 Sep 1986, *G. Davidse & G. Herrera* 30954 (holotype, MO).

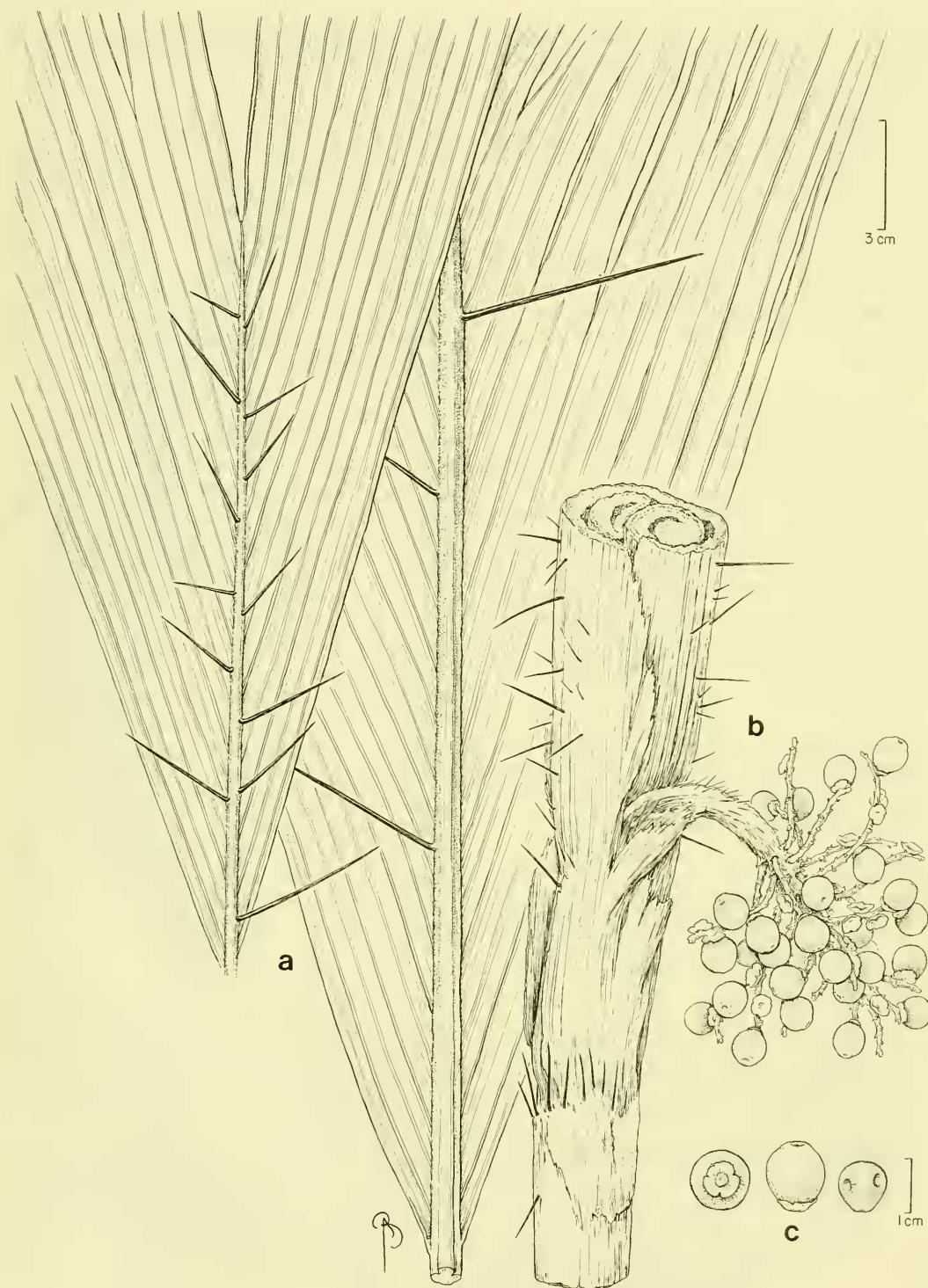
Forma fructuum Bactris mexicana similis sed foliis simplicibus plicatisque.

Stems usually solitary, rarely cespitose, 1.5–3.5 m tall, 2.2–3 cm diam, usually spiny on internodes. Leaves 4–9; sheath 20–29 cm long, sparsely covered with black spines to 3 cm long; petiole 40–45 cm long, with black spines to 6 cm long; rachis 29–70 cm long, without spines or with round black spines to 6 cm long; blade usually simple and deeply bifid, concave, glabrous, leathery, with very prominent veins adaxially, occasionally irregularly pinnate, when bifid the lobes 11–20 cm wide at apex of rachis, 35–60 (–90) cm long from apex of rachis to tip, when pinnate the pinnae 55–90 cm long, 2.5–10 cm wide, the apical one much wider. Inflorescences interfoliar; peduncle 10–11 cm long, 8–10 mm wide, strongly recurved at anthesis, glabrous or covered with short spines; prophyll 11–12 cm long, 3–4 cm wide; peduncular bract 23–27 cm long, 3 cm wide, sparsely covered with short black spines to 0.5 cm long, occasionally almost glabrous; rachis 1.8–3 cm long; rachillae 18–25, 5–6 cm long, 1 mm diam at anthesis; triads irregularly arranged amongst paired or solitary staminate flowers; flowers not seen; fruits ovoid with prominent stigmatic residue, 1.1–1.2 cm long, 0.9–1.1 cm diam, orange, glabrous; mesocarp mealy, fibrous; endocarp turbinate; endocarp fibers few, free, terete; endocarp pores equidistant; fruiting perianth with a minutely 3-lobed, 1 mm long calyx and truncate 3 mm long corolla.

ADDITIONAL SPECIMENS EXAMINED. — NICARAGUA. Chontales: 4 km N of Santo Domingo, ca. 12°17'N, 85°6'W, 280 m, *Grijalva* 3784 (NY). Zelaya: Monkey Point, Caño El Pato, 11°35'N,

FIGURE 4. *Bactris grayumii* (Davidse & Herrera 30954). A. Leaf blade. B. Infructescence. C. Fruit in two views and seed (right). A & B same scale.





83°42'W, 10 m, *Moreno* 12427 (MO); Comarca "Bodega," 30 km NE of Río Blanco, 13°03'N, 84°58'W, 80–100 m, *Moreno* 24040 (MO); 30 km N of Río Blanco, 13°03'N, 84°58'W, 80–100 m, *Moreno* 24075 (MO); Caño Sardina, 11°40'N, 84°26'W, *Stevens* 6362 (NY); Caño Zamora, Río Rama, ca. 11°57'N, 84°16'W, 10 m, *Stevens* 8874 (MO).

COSTA RICA. Limón: Refugio Barra del Colorado, 10°38'N, 83°45'W, 10–15 m, *Grayum et al.* 8995 (MO); Parque Nacional Tortuguero, 10°32'N, 83°30'W, 2–4 m, *Robles* 1856 (MO), *Solano* 20 (MO). San José: along Río Negro, ca. 1.5 km E of Santa Rosa de Puriscal, 9°42'N, 84°23'W, 320 m, *Grayum et al.* 8310 (MO).

DISTRIBUTION AND HABITAT. — Nicaragua (Chontales, Zelaya) and Costa Rica (Limón, San José); lowland rainforest below 350 m elevation, usually near sea level.

DISCUSSION. — This species sometimes occurs sympatrically with *Bactris militaris*, which it resembles in its usually simple leaves, but these are ovate, shorter and wider, and do not have parallel margins. *Bactris grayumii* is further distinguished from *B. militaris* by its recurved inflorescence. The fruits very much resemble those of *B. mexicana*.

11. *Bactris guineensis* (L.) H. E. Moore, Gentes Herb. 9:251. 1963. *Bactris minor* Jacq., nom illeg., Select. stirp. amer. hist. 234. 1780–1781. *Cocos guineensis* L., Mant. pl. 137. 1767.
Fig. 5

TYPE. — Jacq., Select. stirp. amer. hist., pl. 171, fig. 1, 1763 (lectotype, designated by Moore, 1963).

Bactris rotunda Stokes, Bot. mat. med. 4:394. 1812.
Nom. superfl.

Bactris horrida Oerst., Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1858:41. 1859.

TYPE. — Nicaragua. **Granada:** Granada, n.d., A. Oersted 6531 (lectotype, here designated).

Bactris oraria L. H. Bailey, Gentes Herb. 6:232. 1943.

TYPE. — PANAMA. Panamá: Taboguilla Island, Panama Bay, 1 Jun 1941, P. Allen 2543 (holotype, BH).

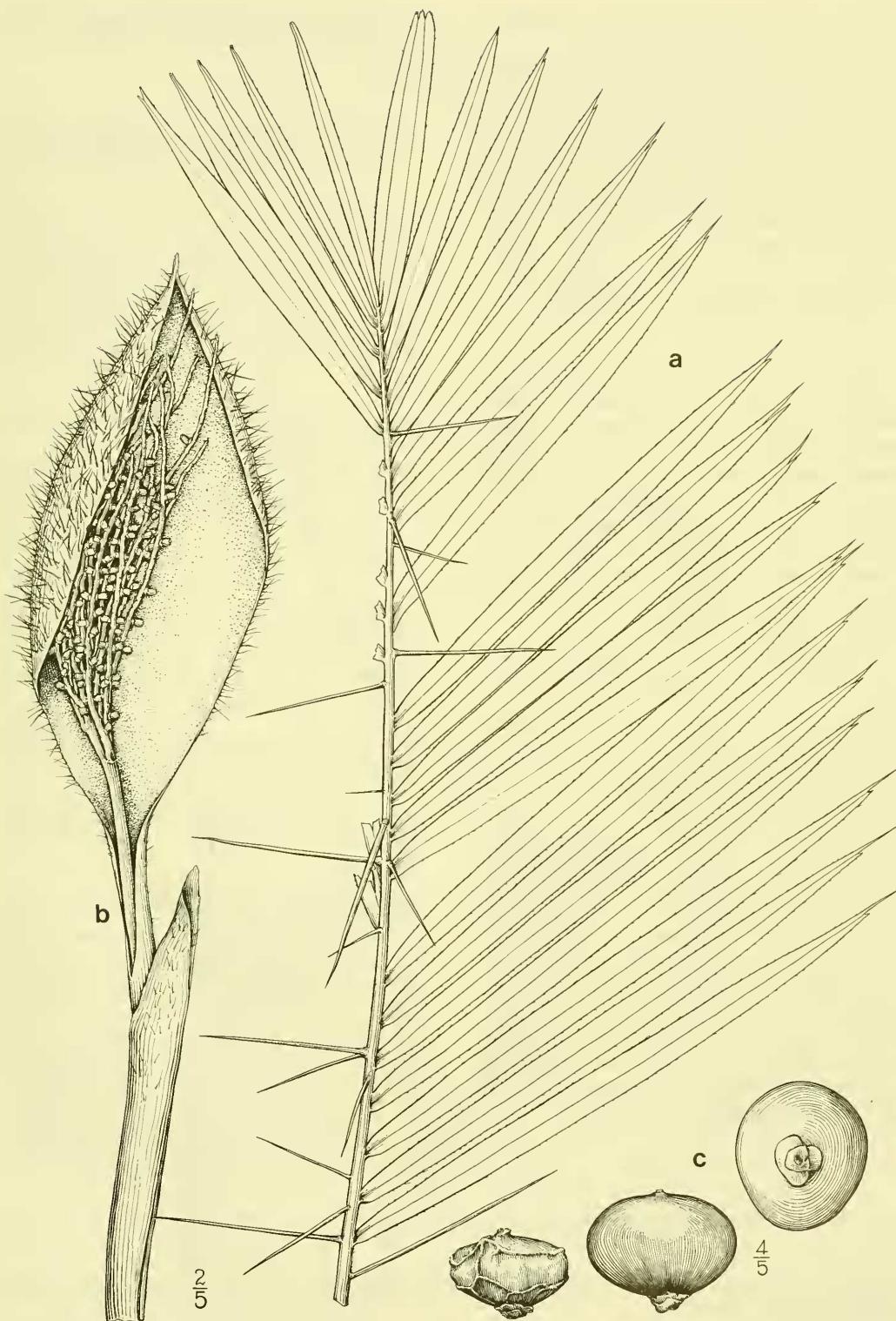
Stems cespitose, 0.8–3 m tall, 2.6–3 cm diam, often covered with dead, persistent leaf bases. Leaves 5–6; sheath 15–60 cm long, fibrous; sheath, petiole and rachis densely to moderately covered with yellowish (black at base and apex), terete spines to 9 (–15) cm long; petiole short, to 5 cm long; rachis 20–40 cm long; pinnae 20–42 per side, regular or slightly irregularly arranged (often with gaps), spreading ± in the same plane or in various planes, linear, ± equally and briefly bifid at the apex, pale green and easily falling on dried specimens; middle pinnae 15–30 cm long, 0.9–2 cm wide. Inflorescences interfoliar; peduncle 10–20 cm long, straight to slightly curved in fruit, spiny; prophyll to 20 cm long; peduncular bract 25–35 cm long, moderately covered with spreading, yellowish spines to 1 cm long; rachis 2–5 cm long; rachillae 11–30, 8–11 cm long, slender; triads irregularly arranged amongst paired or solitary staminate flowers; staminate flowers 4 mm long; sepals very briefly connate below, free above, narrowly triangular, 2 mm long; petals connate below for ca. half their length, free and valvate above, 4 mm long; pistillate flowers 3.5 mm long; calyx 3-lobed, 1 mm long; corolla tubular, lobed at the apex, 3 mm long; staminodes absent; fruits depressed-globose, briefly rostrate, 1.5–2 cm diam, purple-black; mesocarp juicy; endocarp depressed-oblong; endocarp fibers numerous, with juice sacs attached; endocarp pores offset; fruiting calyx minute, corolla 3 mm, truncate.

ADDITIONAL SPECIMENS EXAMINED. — NICARAGUA. Chontales: Highway 7 between Boaco and Acoyapa, 100–250 m, *Bunting & Licht* 734 (F). **Granada:** Granada, *Baker* 193 (CAS, DS, MICH), 654 (US); Realejo, *Oersted* 6537 (C); Lago de Nicaragua, Las Isletas, Isleta de Cementerio, *Guzmán & Castro* 106 (MO).

COSTA RICA. Guanacaste: Hacienda La Pacifica, 10°30'N, 85°10'W, 50 m, *Gentry & Woodruff* 71520 (MO); Comeclo, 5 km W of Bagaces, *Opler* 930 (F). **Puntarenas:** Playas Doña Ana, near Barranca, *Crow*

FIGURE 5. *Bactris guineensis* (Allen 2543). A. Leaf apex. B. Inflorescence. C. Left to right: dry, shriveled fruit; mature fruit in two views. Courtesy of the L. H. Bailey Hortorium, Cornell University.





& Rivera 6218 (F, MO); El Ostillero, Nicoya Peninsula, 0-10 m, Cook & Doyle 639 (US).

PANAMA: Province unknown: Allen 2551 (MO). Canal Area: Balboa, Standley 25496 (US); La Jagua, Bartlett 16390 (MICH), 16996 (MICH); 3 mi. E of Panama City, Maxon et al. 7100 (US), Doyle 20 (US); Matías Hernández Pittier 6953 (US). Coclé: Aguadulce, Pittier 4975 (US); 20 mi. S of Natá, Croat 9644 (MO, SCZ); Cerro Mangote, McPherson 10047 (CAS). Los Santos: 7 mi. S of Chitre, Croat 9710 (MO, SCZ). Panamá: E of Río Venado, 8°45'N, 79°39'W, Knapp 1929 (MO); Lago Sororia, NE of Nueva Gorgona, S of Chamé, 8°33'N, 79°51'W, 5 m, de Nevers & Piperno 10547 (CAS, PMA).

DISTRIBUTION AND HABITAT. — Pacific slope of Central America in Nicaragua (Chontales, Granada), Costa Rica (Guanacaste, Puntarenas), Panama (Canal Area, Coclé, Los Santos, Panamá), and in northern Colombia (Atlántico, Bolívar, La Guajira, Magdalena) and Venezuela (Apure, Cojedes, Guárico, Monagas, Portuguesa); open, often disturbed areas, and deciduous or semi-deciduous forest, often near the coast, in areas that experience prolonged dry seasons, to 850 m elevation.

LOCAL NAMES AND USES. — Costa Rica: *viscoyol*. Nicaragua: *coyolito*. Panama: *uvita de monte*.

DISCUSSION. — This is one of the most easily recognized species in the genus. The plants are small, the pinnae are short, glabrous, narrow and bifid, the spines of the stem and leaves are terete and usually yellowish, and the armature of the peduncular bracts is sparse. Most of these characters are shared with other species individually, but in combination they serve to distinguish this species. *Bactris guineensis* is further distinguished by occurring in the driest conditions of any Central American *Bactris*. Dahlgren (1959) presents two plates of *Bactris horrida*; plate 50 figures A. Oersted s.n. (C sheet 6537), but the leaf shown is actually *B. major*. The numerically corresponding bottled inflorescence (C 6537A, not figured by Dahlgren) is *B. horrida*.

12. *Bactris hondurensis* Standl., Trop. Woods 21:25. 1930.

Fig. 6

TYPE. — Honduras. Atlántida: Lancetilla Valley, near Tela, 150 m, 6 Dec 1927-20 Mar 1928, P. Standley 56798 (holotype, F; isotype, US).

Bactris pubescens Burret, Repert. Spec. Nov. Regni Veg. 34:197. 1934.

TYPE. — COSTA RICA. Alajuela: San Carlos, 8 Jun 1901 Koschny s.n. (holotype, B, destroyed).

NEOTYPE. — COSTA RICA. Alajuela: Río San Carlos, 1 km E of Jabillos, 10°22'N, 84°32'W, 150 m, 1 Jun 1986, G. de Nevers 7808 (MO, here designated).

Bactris wendlandiana Burret, Repert. Spec. Nov. Regni Veg. 34:198. 1934.

TYPE. — COSTA RICA. Sarapiquí, n.d., *H. Wendland* s.n. (holotype, B, destroyed).

LECTOYPE. — COSTA RICA. Province Unknown: "flum. Sarapiquí," 1857, *H. Wendland* s.n. (K, here designated).

Bactris standleyana Burret, Repert. Spec. Nov. Regni Veg. 34:199. 1934.

TYPE. — COSTA RICA. Guanacaste: Tilarán, 500-650 m, 10-31 Jan 1926, P. Standley & J. Valerio 44446 (holotype, US).

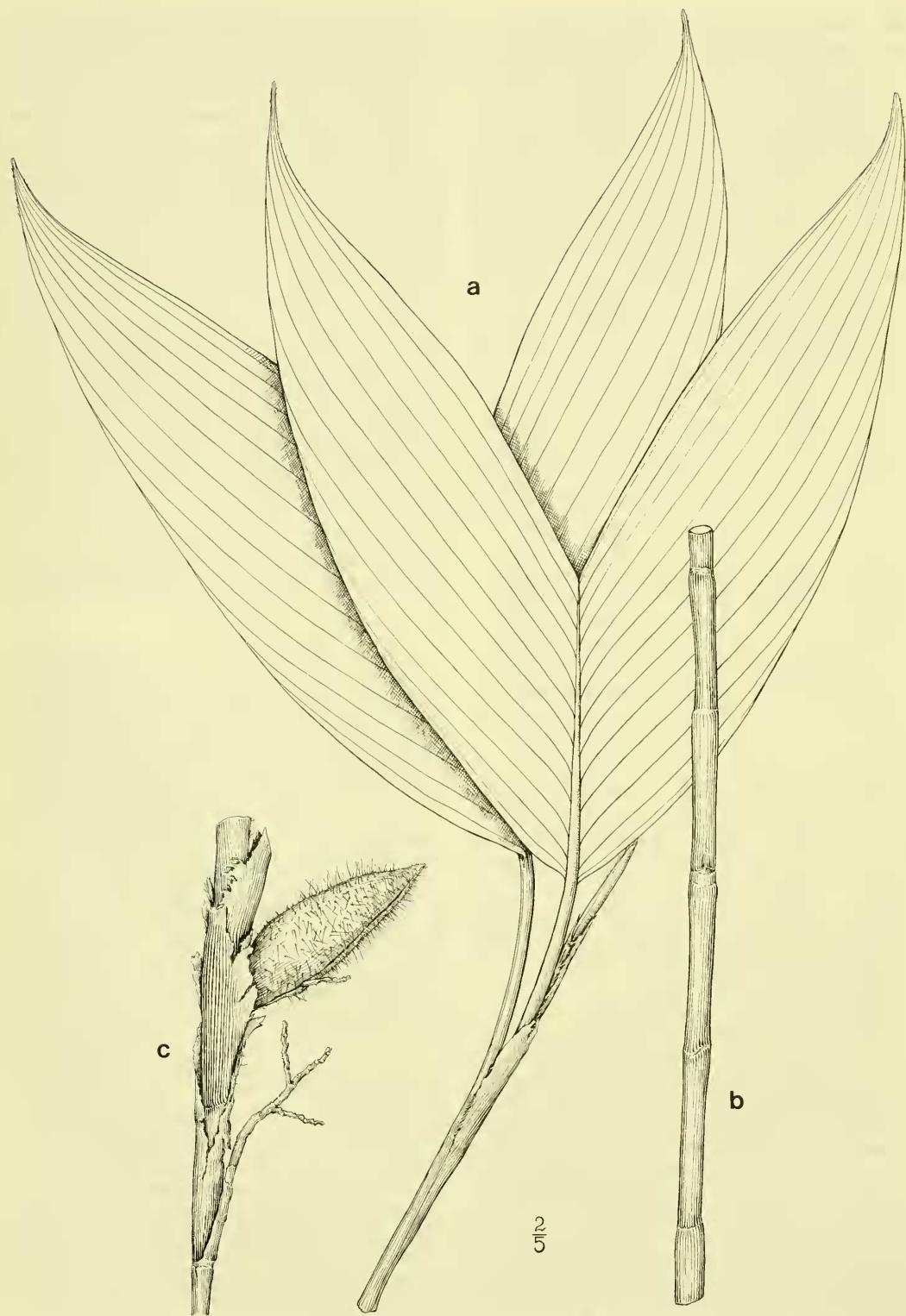
Bactris paula L. H. Bailey, Gentes Herb. 6:226. 1943.
Yuyba paula (L. H. Bailey) L. H. Bailey, Gentes Herb. 8:173. 1949.

TYPE. — PANAMA. Coclé: El Valle de Antón, La Mesa, 1000 m, 22 Jun 1941, P. Allen 2567 (holotype, BH).

Stems cespitose or apparently sometimes solitary, 1-2.5 (-4) m tall, 0.5-1.5 cm diam. Leaves 5-9; sheath 9-25 cm long, sheath and petiole with few, black spines to 1 cm long, occasionally interspersed with longer, yellowish or black spines to 2 cm long; petiole 16-27 cm long; rachis 15-50 cm long; blade usually simple, bifid, 36-71 cm long, 26-39 cm wide, often with a pair of broad (rarely narrow) apical pinnae and 1-8 (-15) narrower, irregularly spaced, sigmoid basal pinnae, occasionally with cross-veins, usu-

FIGURE 6. *Bactris hondurensis* (Allen 2567). A. Leaves. B. Stem. C. Inflorescence. All $\times 2/5$. Courtesy of the L. H. Bailey Hortorium, Cornell University.





ally minutely, densely and softly white-pubescent abaxially. Inflorescences interfoliar; peduncle 7–11 cm long, terete, straight at anthesis, becoming arched in fruit; prophyll 8–9 cm long; peduncular bract 13–18 cm long, densely to moderately covered with soft, spreading, yellowish, black or brown spines to 1 cm long; rachis 1–3 cm long; rachillae 3–7, 2–5 cm long, slender; triads irregularly arranged amongst paired or solitary staminate flowers; staminate flowers 7 mm long; sepals connate below, free above, 1.5 mm long; petals connate below for ca. half their length, free and valvate above; pistillate flowers (immature) 2 mm long; calyx 1 mm long; corolla 2 mm long, lobed at the apex; staminodes minute or absent; fruits very broadly obovoid, briefly rostrate, 1.2–1.5 cm diam, orange or red, glabrous; mesocarp mealy; endocarp turbinate; endocarp fibers few or absent, without juice sacs; endocarp pores symmetrical; fruiting calyx minute, corolla 2 mm, irregularly parted.

ADDITIONAL SPECIMENS EXAMINED. — HONDURAS. Atlantidá: Lancetilla valley near Tela, 20–600 m, MacDougal *et al.* 3335 (MO), Standley 54212 (F). Gracias a Diós: Río Platano, Quebrada Tiro, 15°43'N, 84°50'W, 200 ft., Saunders 1180 (US).

NICARAGUA. Bluefields: 3.6 km SE of Cerro San Isidro, Río Kama, Río Escondido, 12°05'–12°15'N, 83°45'–84°20'W, 0–65 m, Proctor *et al.* 26907 (NY). Chontales: Cerro Oluma, top of Cordillera Amerisque, 12°18'N, 85°24'W, 840 m, Gentry *et al.* 43892 (MO). Jinotega: Salto Kayaska, Río Bocay, ca 13°51'N, 85°22'W, 190–340 m, Stevens *et al.* 16458 (MO). Río San Juan: Bocas de Sábalo, 11°03'N, 84°27'W, 70–100 m, Moreno 26773 (MO); El Castillo, 11°02'N, 84°24'W, Salick 7813 (MO). Zelaya: between El Muelle de los Bueyes and Villa Somoza, Bunting & Lichi 1079 (F); Mpio. Siuna, Comarca Danlí, Ortiz 236 (NY).

COSTA RICA. Alajuela: Río Sarapiquí, 10°16'N, 84°11'W, 830 m, Croat 68334 (MO); Monteverde Cloud Forest Reserve, Peñas Blancas river valley, 10°20'N, 84°40'W, 840–900 m, Haber 5458 (MO), 7344 (MO); Plains of San Carlos, 100 m, Cook & Doyle 86 (US); between Tronadora & Arenal, Read & Daniels 74–10 (US); between Tronadora & Tilarán, 600 m, Read & Daniels 74–15b (US); 74–15c (US); Ciudad Arenal, Read & Daniels 74–18 (US); Turrialba, 695 m, Read & Daniels 74–60 (US); 74–61 (US); Guanacaste: along Río Las Flores between Quebrada Desprendimiento and Q. Sanguijuela, Hacienda Montezuma, 450 m, 10°40'N, 85°04'W, Grayum *et al.* 4935 (MO); 4.7 km before Tronadora on road to Ti-

larán, 600 m, Read & Daniels 74–15 (US); El Arenal, 485–600 m, Standley & Valerio 45309 (US); 45313 (US); La Tejona, north of Tilarán, 600–700 m, Standley & Valerio 46005 (US). Heredia: Finca La Selva, near Río Puerto Viejo, about 2 km upstream from confluence with Río Sarapiquí, 10°26'N, 84°W, 100 m, Burger & Stolze 5891 (F, NY), Gentry & Ortiz 78616 (MO), Hammel 12166 (MO), Henderson 46 (NY), McDowell 967 (MO); between Río Peje and Río Sardinalito, 10°17'N, 84°04'W, 700–750 m, Grayum & Jermy 6803 (MO). Limón: between Fila Dimat and Río Urén, Gómez *et al.* 23749 (CAS, MO); Refugio Nacional Barra del Colorado, 10°38–47'N, 83°35–45'W, 0–15 m, Grayum 9833 (MO), Grayum 9835 (MO), Stevens 24112 (MO, NY); Cairo, Río Reventazon, 25 m, Standley & Valerio 48942 (US), Loomis 4 (US); vicinity of USDA Rubber Experiment Station, Los Diamantes, on Río Santa Clara, 1.6 km E of Guápiles, 200 m, Holm & Iltis 323 (BH, WIS), Astúa Pirie Reserve, United Fruit Company, Seibert 1598 (US); Standley 37190 (US); Parque Tortuguero, 10°31'N, 83°30'W, 4 m, Robles 1466 (MO, NY). Puntarenas: Reserva Biológica Carara, 9°46'N, 84°34'W, 480–520 m, Grayum *et al.* 9610 (MO); Coto Brus Guaymí Reserve E of Limoncito ford/bridge, 600 m, Kosear 282 (CAS). San José: Río Naranjo, 200–250 m, Tonduz 7638 (BR).

PANAMA. Bocas Del Toro: Changuiñola, Correa *et al.* 3905 (PMA); above RR station at Milla 7.5, Croat & Porter 16397 (MO). Coclé: El Valle de Antón, ca. 1000 m, Allen 2695 (BH, US); 7 km from Llano Grande on road to Coclesito, 1200 ft., Antonio 1402 (MO, PMA); Coclecito rd., 4 mi. beyond continental divide, 8°42'N, 80°24'W, de Nevers & McPherson 6707 (MO, NY); near sawmill 16.7 km N of turnoff to Coclesito from Llano Grande, 700 ft., Hammel 1859 (MO); Coclesito road, 1500 ft., Hammel 3479 (MO); El Copé on Pacific side, 2400 ft., Antonio 2102 (MO); Read & Watson 84–52 (US); La Mesa above El Valle, ca. 800 m, Croat 25336 (MO); 3000 ft., Duke & Lallathin 15021 (MO); Alto Calvario, 7+ km N of El Copé, 700–900 m, Folsom 3259 (MO, PMA). Colón: near Guásimo, Croat 9922 (MO); trail from Alto Pacora to Cerro Brewster, 9°18'N, 79°16'W, de Nevers *et al.* 6240 (BH, MO, PMA). Darién: Parque Nacional del Darién, ridge between Río Topalisa and Río Pucuro, ca 13 km E of Pucuro, 8°03'N, 77°20'W, 450–600 m, de Nevers *et al.* 8329 (CAS, MO); S of Garachiné above Casa Vieja, W flank Serranía Sapo, 7°58'N, 78°23'W, 500–800 m, Hensold 1130 (MO), Herrera *et al.* 996 (MO); Río Tuquesa, camp called Charco Peje, ca. 250 m, Mori 7075 (MO). Panamá: El Llano-Cartí road, km 14, 350–500 m, Folsom *et al.* 1489 (MO), km 19, ca. 500 m, Busey 882 (MO); Gorgas Memorial Labs yellow fever research camp, 5–10 km NE of Altos de Pacora,

ca. 600 m, Mori & Kallunki 3404 (MO, PMA). San Blas: Yar Bired (Cerro San José), continental divide between Cangandí and San José, 400–500 m, 9°20'N, 79°08'W, de Nevers & Herrera 6940 (MO), 7005 (MO, NY); Cerro Brewster, 9°18'N, 79°16'W, 800–850 m, de Nevers et al. 6281 (MO), 5558 (MO, NY), El Llano-Cartí rd., km 18.3, 9°19'N, 78°55'W, de Nevers 5982 (MO), 4858 (MO), 5883 (MO, NY), 7682 (MO), km 26.5, 200 m, de Nevers et al. 5250 (MO); near Cangandí, 9°27'N, 79°07'W, Herrera 205 (CAS); Campamento Kariadi, Río Ispergandi, 3 km upriver, 9°15'N, 78°15'W, 50 m, Herrera et al. 1080 (MO); Isla de Nargana, 9°22'N, 78°35'W, 50–100 m, Herrera et al. 1254 (MO); Aila Tiwar (Río Acla), 8°48'30"N, 77°40'30"W, 25–100 m, Sugden 350 (MO); (San Blas) Armila, 8°39'N, 77°27'W, 0–400 m, de Nevers & Herrera 10697 (CAS, PMA). Veraguas: valley of Río Dos Bocas along road between Escuela Agrícola Alto Piedra and Calovébora, 15.6 km NW of Santa Fe, 450–550 m, Croat 27666 (MO, PMA); Mori & Bolten 7656 (MO); trail to Cerro Tute, 800–1000 m, de Nevers et al. 10554 (CAS, NY, COL), 10588; trail from Bajo Chitra to Río Gatú, 8°34'N, 80°56'W, de Nevers & McPherson 6787 (MO, PMA); Río Concepción to Río Barrera, 0–200 m, Hammel 5149 (PMA).

DISTRIBUTION AND HABITAT. — Honduras (Atlantidá), Nicaragua (Bluefields, Chontales, Jinotega, Río San Juan, Zelaya), Costa Rica (Alajuela, Guanacaste, Heredia, Limón, Puntarenas, San José), Panama (Bocas Del Toro, Coclé, Colón, Darién, Panamá, San Blas, Veraguas) to northwestern Colombia (Antioquia, Chocó); lowland rain forest at elevations below 1000 m.

LOCAL NAMES AND USES. — Costa Rica: *biscoyol*, *caña brava* (Spanish); *kaa* (Guaymí). Nicaragua: *coyolillo*, *huiscoyol*, *montiel* (Spanish). Panama: *pacaya de danto* (Spanish), *uga wawad* (Kuna). In Kuna “wawad” means hairy, and “uga” is a generic term for palms of the genus *Geonoma*, thus to the Kuna *Bactris hondurensis* is the “hairy *Geonoma*,” an apt association for this non-spiny species.

DISCUSSION. — Although Standley’s minimal description in *Tropical Woods* (21:25, March 1930) constituted valid publication of *Bactris hondurensis*, no specimens were cited. We thus accept as holotype the specimen cited as such in Standley’s much more detailed description that appeared in *Publ. Field Columbian Mus., Bot. Ser.* (8:4, July 1930).

The soft, almost invisible pubescence and often complete lack of spines of *B. hondurensis* render it perhaps the most distinctive species of the genus in Central America. It is variable in degree of blade division (from simple and bifid to pinnate with wide apical pinnae) and habit (from solitary to cespitose and from 0.5 to 3 m in height). The inflorescence is typically small and erect at anthesis. It could easily be confused with *B. charnleyae*, which is distinguished by its abundant endocarp fibers with juice sacs attached; without fruits, the latter species can be separated by the elongate, soft, black spines on the peduncle and peduncular bract. The endocarp sometimes has scattered fibers, contra Sanders (1991).

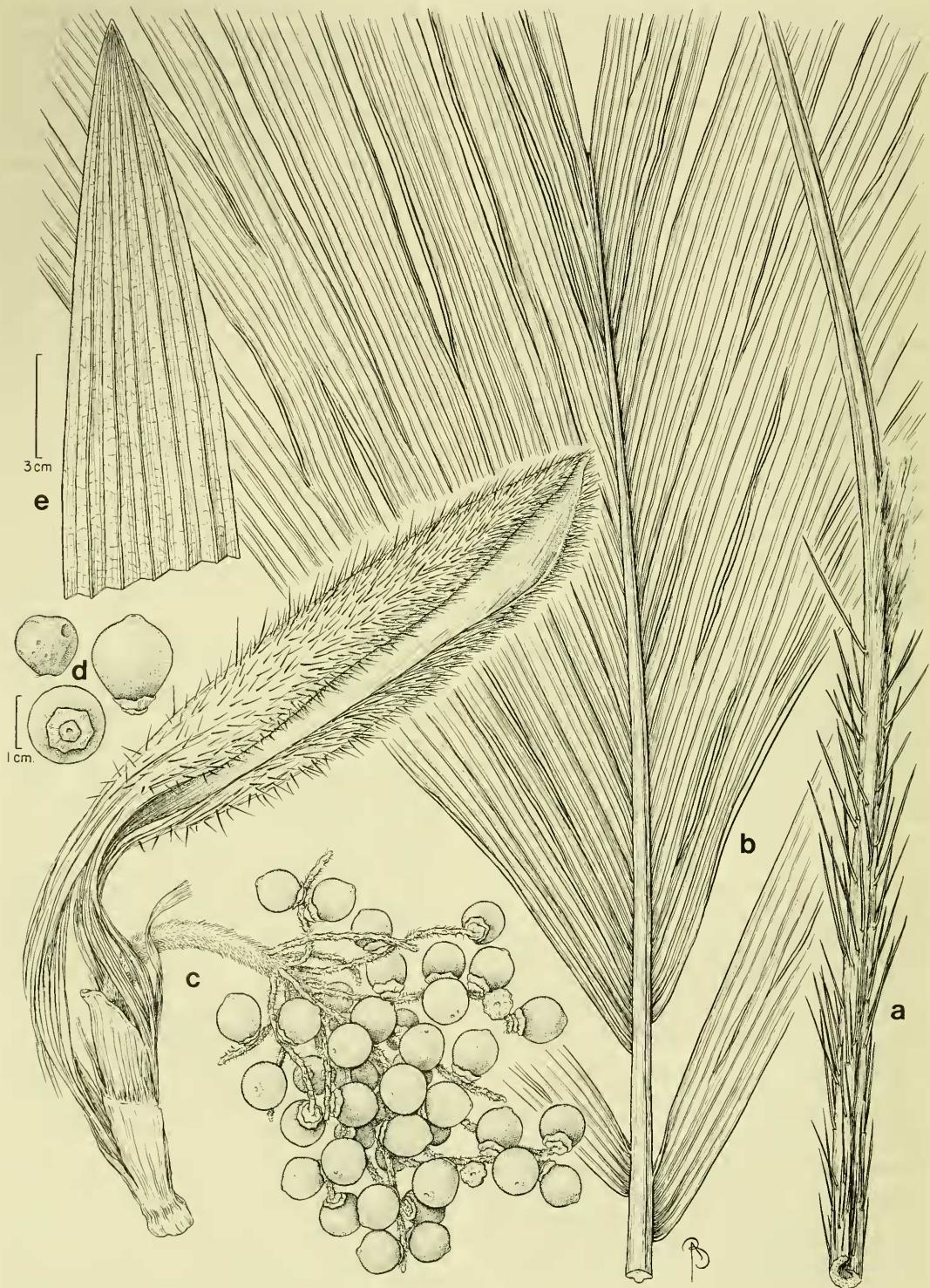
13. *Bactris kunorum* de Nevers & Grayum, sp. nov.

Fig. 7

TYPE. — PANAMA. San Blas: Río Esadi to Cerro Banega, 9°23'N, 78°51'W, 300–530 m, 21 Dec 1985, G. de Nevers & H. Herrera 6672 (holotype, MO; isotype, NY).

Fructibus grandibus aurantiacis Bactris coloradonidis similis sed foliis simplicibus pinnatise plicatis.

Stems cespitose in tight clumps of 4–6 stems 50–60 cm wide, 2–6 m tall, to 5 cm diam, usually spiny on internodes. Leaves 4–9; sheath 22–54 cm long, densely black-spiny; petiole 20–27 cm long, without spines or with black spines to 6 cm long; rachis (42–) 65–135 cm long, without spines or with round black spines to 6 cm long; pinnae 4–14 per side, irregularly arranged in clusters and spreading in various planes, forming a 10–40° angle with the rachis, concave, glabrous, leathery, strongly plicate with prominent veins adaxially, the middle ones 45–87 cm long, 3.5–5.5 cm wide (distal and sometimes proximal ones much wider), blade occasionally simple, bifid, the lobes 11.5–18 cm wide at apex of rachis, 46–52 cm long from apex of rachis to tip. Inflorescences interfoliar; peduncle 10–29 cm long, strongly recurved at anthesis, densely spiny; prophyll 11–14 cm long, 3–4 cm wide, thin, chartaceous; peduncular bract 30–45 cm long, 3–5 cm wide, sparsely covered with short black spines to 0.5 cm long; rachis 3–7 cm long;



rachillae 24–30, 8–14 cm long, 1 mm diam at anthesis; triads irregularly arranged amongst paired or solitary staminate flowers; staminate flowers 2–3 mm long; sepals very briefly connate below, lanceolate, 1 mm long; petals 3 mm long; pistillate flowers 3 mm long; calyx 1 mm long; corolla minutely 3-lobed apically, 3 mm long; staminodes minute; fruits obovoid, flat-topped but with prominent stigmatic residue, 1.4–1.9 cm long, 1.3–2 cm diam, orange or red, glabrous; mesocarp mealy, fibrous; endocarp turbinate; endocarp pitted or smooth, with a few, terete or flat fibers; endocarp pores equidistant; fruiting perianth with a minutely 3-lobed calyx 1 mm long, and crenate corolla 3–4 mm long.

ADDITIONAL SPECIMENS EXAMINED. — PANAMA. Panamá: 6 mi. above Goofy Lake on road to Cerro Jefe, Croat 15208 (CAS, MO); El Llano-Cartí road, km 7–12, 360–400 m, Croat 25088 (MO); km 9.8, 1100–1200 ft., Mori et al. 4162a (MO); Campo Tres, 3 mi. NE of Altos de Pacora, 500–850 m, Croat 22705 (MO), Croat 22758 (MO). San Blas: Cerro Brewster, 9°18'N, 79°16'W, 850 m, de Nevers et al. 5396 (MO); El Llano-Cartí road, km 18.3, 9°19'N, 78°55'W, 350 m, de Nevers 5980 (CAS, NY, PMA), de Nevers & Herrera 7858 (MO), Henderson 88 (NY); trail to Cerro Habu from Río Urgandi, 9°23'N, 78°48'W, 100–300 m, de Nevers et al. 8025 (MO).

DISTRIBUTION AND HABITAT. — Central Panama (Panamá, San Blas) and Colombia (Valle); lowland or premontane rainforest at 300–800 m elevation.

DISCUSSION. — This species is characterized by its large, orange fruits, and simple to pinnate, strongly plicate, leathery leaves. It is similar to *Bactris coloradonis*, but is distinguished by its strongly plicate, leathery leaves. *Bactris kunorum* shares the strongly plicate, leathery leaves of *B. grayumii*, but can be distinguished by its larger fruits and crenate fruiting corolla.

14. *Bactris longiseta* H. Wendl. ex Burret, Repert Spec. Nov. Regni Veg. 34:213. 1934.

TYPE. — COSTA RICA. Heredia: Pedregal, May 1857, H. Wendland 81 (lectotype, GOET, here designated).

Stems cespitose and forming dense to loose colonies, 3–4.5 m tall, 2–2.5 cm diam, spiny on the internodes. Leaves 6–7; sheath 30–41 cm long, with a sparse to dense covering of black spines to 2 cm long; petiole 37–85 cm long, lacking spines or with a few spines to 6.5 cm long; rachis to 135 cm long, without spines or with a few spines to 4.5 cm long; pinnae 15–29 per side, regularly or irregularly arranged in distinct clusters and spreading in slightly different planes, linear to narrowly elliptic, caudate, with 1 prominent main vein, with spines 1–2 cm long on the margins, rarely lacking spines, the middle ones 30–72 cm long, 3.5–7 cm wide. Inflorescences interfoliar; peduncle ca. 10 cm long, strongly recurved; prophyll 7.5–15 cm long; peduncular bract 23–30 cm long, 3–5 cm wide, densely covered with erect, black or brown spines to 1 cm long; rachis 1.5–3 cm long; rachillae 20–30, 4.5–11 cm long, 1 mm diam at anthesis; triads irregularly arranged amongst paired or solitary staminate flowers proximally; staminate flowers 5 mm long, ± persistent after anthesis; sepals very briefly connate basally, free and spreading above, narrowly triangular, 1 mm long; petals 5 mm long, connate basally, free above, lanceolate, fleshy; pistillate flowers 5 mm long; calyx 1.5 mm long; corolla 4 mm long; staminodes absent; fruits obovoid, rostrate, purple-brown, 1.5–1.6 cm long, 1.5–1.6 cm diam; mesocarp juicy; endocarp turbinate, pitted apically; endocarp with numerous fibers, with juice sacs attached; endocarp pores equidistant; fruiting perianth with small calyx, 3–4 mm long, corolla crenate.

ADDITIONAL SPECIMENS EXAMINED. — COSTA RICA. Province unknown: Río Sarapiquí, Wendland s.n. 1857 (K). Alajuela: Río María Aguilar between Cariblanco and San Miguel, Moore 6561 (BH); Cariblanco, Moore 6627 (BH). Heredia: Parque Nacional Braulio Carrillo, sendero del transecto, 10°16'38"N, 84°04'57"W, 1000 m, Boyle 1283 (MO); between Río Peje and Río Sardinalito, 10°17'N,



FIGURE 7. *Bactris kunorum* (de Nevers et al. 5396). A. Portion of leaf sheath and petiole. B. Leaf blade. C. Inflorescence. D. Fruit in two views and seed (upper left). E. Apex of leaf blade showing crossveins. A, B, C and E same scale.

84°04'W, 700–750 m, *Grayum* 6742 (MO); between Corazón de Jesús and La Virgen, 340 m, *Moore* 6575 (BH); Puerto Viejo, Río Sarapiquí, 100 m, *Moore* 6590 (BH), *Holdridge* 5118 (BH), *Moore et al.* 10130 (BH). **Limón:** Barra del Colorado, 10°38'N, 83°45'W, *Grayum et al.* 8999 (MO).

DISTRIBUTION AND HABITAT. — COSTA RICA (Alajuela, Heredia, Limón); lowland rainforest, below 1000 m elevation.

LOCAL NAMES AND USES. — Costa Rica: *huiscoyol*.

DISCUSSION. — This species is distinguished by its usually broad pinnae with spiny margins, its purple-brown fruits with numerous endocarp fibers with juice sacs attached, and its equidistant endocarp pores.

15. *Bactris major* Jacq., Select. stirp. amer. hist. 134. 1780–81. *Bactris ovata* Stokes, Bot. mat. med. 4:394. 1812, nom. superfl. *Augustinea major* (Jacq.) Oerst., Linnaea 28:395. 1856. *Pyrenoglyphis major* (Jacq.) H. Karst., Fl. Columb. 2:141. 1866.

Fig. 8

TYPE. — Jacq., Select. stirp. amer. hist., t. 171, fig. 2. 1763 (lectotype designated by Glassman, 1972).

Augustinea ovata Oerst., Vidensk Meddel. Dansk Naturhist. Foren. Kjöbenhavn 1858:38. 1859. *Pyrenoglyphis ovata* (Oerst.) H. Karst., Fl. Columb. 2:142. 1866. *Bactris ovata* (Oerst.) H. Wendl. in Kerch., Palmiers 234. 1878, non Stokes (1812). *Bactris augustinea* L. H. Bailey, Gentes Herb. 3:95. 1933.

TYPE. — NICARAGUA. State?: Punto Poderoso, 1845–1848, A. Oersted 6532 (holotype, C).

Augustinea balanoidea Oerst., Vidensk Meddel. Dansk Naturhist. Foren. Kjöbenhavn 1858:39. 1859. *Pyrenoglyphis balanoidea* (Oerst.) H. Karst., Fl. Columb. 2:142. 1866. *Bactris balanoidea* (Oerst.) H. Wendl. in Kerch., Palmiers 233. 1878.

TYPE. — COSTA RICA. Puntarenas: Puntarenas, A. Oersted s.n. (C?, n.v.).

Bactris superior L. H. Bailey, Gentes Herb. 3: 99. 1933. *Pyrenoglyphis superior* (L. H. Bailey) Burret, Repert. Spec. Nov. Regni Veg. 34:246. 1934.

TYPE. — PANAMA. Canal Area: Barro Colorado Island, 12 Jun 1931, L. & E. Bailey 162 (lectotype, BH, excluding leaves [here designated]).

Stems cespitose, 2–10 m tall, 2–6 cm diam, forming dense or open colonies, internodes 13–26 cm long, spiny. Leaves 3–10; sheath 22–55 cm long, very fibrous on margins, sheath, petiole and rachis moderately to densely covered with short black spines, these intermingled with longer, brown or black, ± terete spines to 11 cm long; petiole 0.1–1.5 m long; rachis 0.8–1.8 m long; pinnae 28–46 per side, more or less regularly arranged, spreading in the same plane, linear, aristate, middle pinnae 25–60 cm long, 1–3.5 cm wide, minutely spiny on margins, somewhat metallic when dry. Inflorescences interfoliar; peduncle 17–40 cm long, densely spiny, recurved; prophyll 13–30 cm long; peduncular bract 28–60 cm long, densely to moderately covered with black spines to 1 (–2) cm long; rachis 2–4 cm long; rachillae (3–) 5–10 (–17), 15–23 cm long, 2 mm diam at anthesis, 3–4 mm thick in fruit; triads irregularly arranged amongst paired or solitary staminate flowers; staminate flowers 3–8 mm long, somewhat persistent; sepals 1.5–2 mm long, briefly connate below, narrowly triangular; petals connate below for ca. one third their length, free and valvate distally, 3–7 mm long; pistillate flowers 4–8 mm long; calyx 4–6 mm long, minutely spinulose; corolla 3–5 mm long, minutely and densely spinulose; staminodial ring adnate to corolla, to 1 mm long; fruits irregularly ellipsoid to widely obovoid, 3.3–4.5 cm long, 2.3–3.5 cm diam, brown or purple-black, with minute spinules or small brown scales, glabrescent; mesocarp juicy; endocarp ellipsoid; endocarp fibers numerous, free; endocarp pores equatorial, equidistant, but fertile one displaced proximally; fruiting perianth with regularly lobed calyx shorter than the regularly lobed corolla, staminodial ring adnate to corolla.

ADDITIONAL SPECIMENS EXAMINED. — MEXICO. Chiapas: Mpio. Ocosingo, Río Usumacinta, ruins of Yaxchilán, limestone ridges, 300 m, *Breedlove* 33902 (CAS). Oaxaca: between Collantes and Minizo, *Conzatti* 4412 (US); Lagoon of Tonomeca, *Reko* 3461 (US). Tabasco: *Matuda* 3192 (US); San Juan Bautista, Río Grijalva, *Doyle* 265 (US); 22 km W of H. Cárdenas, Colegio Superior de Agricultura, *Iltis* 27260 (WIS). Veracruz: Mpio. Las Choapas, Rancho Gavilán, 3 km before Las Choapas, 17°54'N, 94°06'W, *Calzada* 6049 (F).

BELIZE. “fruit in market,” *Maxon & Hay* 2049 (US). Belize: Belize River near Belize, *Lundell* 4334 (MICH). Cayo: Belize River, Ridge Lagoon River ca

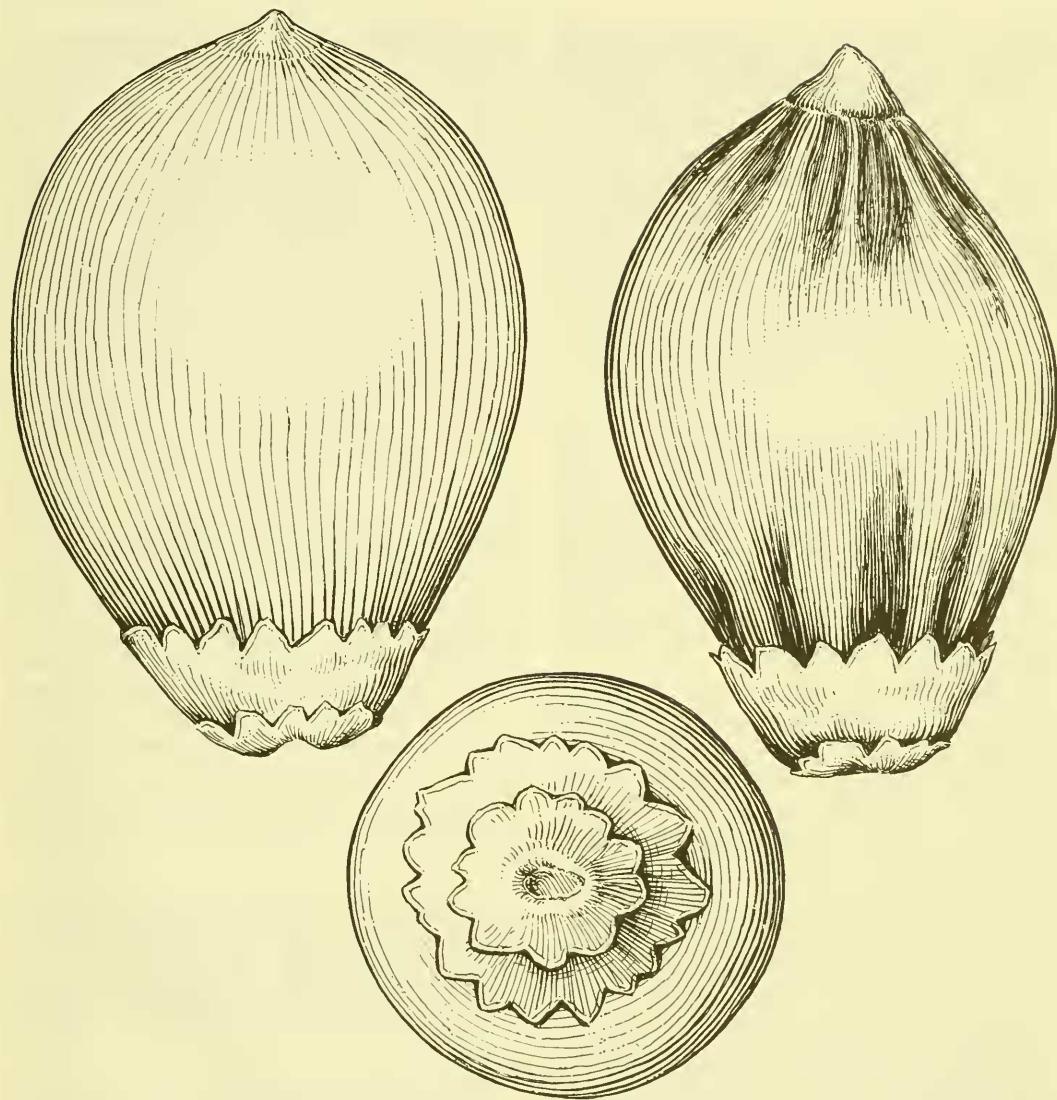


FIGURE 8. *Bactris major* (Bailey 162). Fruit in three views (life size). Courtesy of the L. H. Bailey Hortorium, Cornell University.

12 mi. NW of Belize, Croat 23437 (MO). Corozal: Gentle 256 (MICH), Gentle 429 (MICH). Stann Creek: Prospecto-Maskall road, Gentle 900 (MICH); San Andrés, Lundell 4842 (MICH).

GUATEMALA. Alta Vera Paz: banks of Río Polochic, below Panzós, Maxon & Hay 3096 (US); Escuintla: Escuintla, 335 m., Smith 2060 (US). Izabal: shore of Lake Izabal, Blake 7857 (US); vicinity of Quiriguá, 75–225 m., Standley 24458 (US); Río Polochic, Cook & Doyle 6 (US), 7 (US), 8 (US); Sepacuité, Cook & Doyle 16 (US). Petén: El Paso, Lundell 1522 (MICH); along Río Chinajá, N of Chi-

najá on trail to Zacatal, 50–70 m., Steyermark 39211 (F). Retalhuleu: between Nueva Linda and Champerico, ca. 120 m., Standley 87626 (F).

EL SALVADOR. Ahuachapan: El Imposible, 13°39'N, 89°56'W, Sandoval 302 (MO). La Libertad: Finca Santa Emilia, W of La Libertad, Carlson 562 (F); Hacienda Sol y Mar, km 45, Tamanique, 20 m., Flores 30 (PMA). La Unión: Laguna de Maquique, Standley 20900 (US). San Miguel: Laguna de Olomega, Standley 20992 (US); ca 50 mi. NW of San Miguel on road CA-1, Croat 32793 (MO). San Salvador: near San Salvador, Calderón 1185 (US); San

Vicente: 2 mi. W of Puente de Cuscatlán, 250 ft, *Allen* 7270 (US). **Sonsonate:** vicinity of Sonsonate, 220–300 m, *Standley* 22351 (US).

HONDURAS. *Atlántida:* Bel Aire, 10 km S of Jutiapa along road to Trujillo from La Ceiba, 15°45'N, 86°30'W, *Balick et al.* 1713 (NY, US); Triunfo, near Tela, *Standley* 53842 (US), 54714 (US). *Cokón:* Río Guaimoreto, 15°57'N, 85°54'W, *Saunders* 611 (F, US). *Comayagua:* Agua Caliente, 220 m, *Nelson et al.* 6291 (MO). *Cortés:* San Pedro Sula, *Thieme* 5536 (US). *Islas de la Bahía:* Isla de Roatán, French Harbour, 50 m, *Nelson & Romero* 4418 (MO). *Yoro:* 3 km NW of Santa Rita on road to Negrita, *Harmon & Dwyer* 3863 (MO).

NICARAGUA. *Chontales:* between Santo Tomás and Villa Somoza, *Bunting & Lichi* 1103 (F, NY). *Rivas:* Islas Ometepe-Mérida, 11°27'N, 85°32'W, 700–800 m, *Robleto* 354 (MO). *Río San Juan:* Managua, *Garnier* 778 (US); along road to San Carlos, 5 km SE of Río Oyate, 11°42'N, 84°57'W, 40 m, *Miller & Nee* 1369 (MO); Bocas de Sábalos, 11°03'N, 84°27'W, 70–100 m, *Moreno* 26729 (MO). *Zelaya:* Yauya, ca 18 km SE of La Luz, 150–200 m, *Bunting & Licht* 598 (F).

COSTA RICA. *Alajuela:* Cantón de Upala, Llano de Achote, 10°53'N, 84°59'W, 35 m, *Grayum et al.* 9074 (MO, NY). *Puntarenas:* west of Manuel Antonio National Park, *Graní* 91-01565 (US); Cabo Blanco Nature Reserve, 9°35'N, 85°06'W, 0–200 m, *Burger & Liesner* 6681 (F, MO, NY); Isla del Caño, *Gómez* 19989 (MO); Isla San Lucas, Golfo de Nicoya, 9°57'N, 84°54'W, 5–40 m, *Grayum* 4283 (MO); Reserva Biológica Carara, 9°48'N, 84°36'W, 20 m, *Grayum & Warner* 8365 (MO); Lagartos Bay, Gulf of Nicoya, *Barclay* 2773 (BM); Nicoya Peninsula, Colonia Macio, *Cook & Doyle* 740 (US).

PANAMA. Province unknown: La Jagua, *Bartlett* 17020 (MICH). Canal Area: Summit, *Bartlett & Lasser* 16791 (MICH), 16793 (MICH), 16795 (MICH); Juan Mina, Chagres River, *Bartlett & Lasser* 16317 (MICH); vicinity of Albrook Tower, *Blum* 838 (SCZ); Panama City, Curundu, 50 m, *Churchill* 6028 (CAS, MO); Barro Colorado Island, *Bartlett* 16747 (MICH), *Croat* 5510 (SCZ), *Croat* 5650 (SCZ), *Croat* 5740 (MO), *Croat* 7142 (MO), *Croat* 7284 (MO), *Croat* 7289 (MO), *Croat* 8567 (MO), *Croat* 8742 (MO), *Croat* 9045 (MO, SCZ), *Croat* 9553 (MO), *Croat* 10735 (MO), *Croat* 10740 (MO, SCZ), *Croat* 11003 (MO), *Croat* 11954 (MO), *Croat* 11980 (MO, SCZ), *Kenoyer* 162 (US), *Maxon et al.* 6829 (US); Gamboa, *Nee* 7532 (PMA), *Schmalzel* 925 (MO), *Shattuck* 938 (MO); Balboa, *Cook & Martin* 15 (US); Madden Forest, *Croat* 8954 (MO), 11055 (MO), 10786 (MO); road C2F, 0.5 mi. NW of Summit Naval Radio Station, *Croat* 11034 (MO), 11036 (MO); forest across from Summit Golf Course, *Croat* 11202 (MO, SCZ); Mar-

garita Swamp, *Cook & Martin* 2 (US); Ft. Sherman, 8 April 1925, *Cook s.n.* (US); near beach at Ft. Kobbe, *Duke* 4714 (MO); 8 km W from Balboa in Rodman Tank Farm, *Garber* 153 (MO); Coco Solo, *Gentry* 6479 (MO); NW edge of Gamboa, near Chagres airport, *Mori & Kallunki* 4722 (MO); Río Indio de Gatún, *Pittier* 2780 (US). *Chiriquí:* Burica Peninsua, Quebrada Mérida, 6 km S of Puerto Armuelles, *Busey* 704 (MO, PMA); Burica Peninsula, Quebrada Tuco, 9 mi. S of Puerto Armuelles, 0–150 m, *Croat* 22114 (MO). *Coclé:* Cerro Mangote, *McPherson* 10046 (MO); near Capellánia, *McPherson* 10048 (MO); Tonosí, Río Tonosí, Quebrada Ocho Paso, *Stern et al.* 1832 (US); Penonomé, *Williams* 52 (NY, US). *Darién:* El Real, 8°0'N, 77°44'W, *de Nevers & Herrera* 8240 (CAS, MO); Río Tuiraca, 4 mi. above Chepigana, *Duke* 5487 (MO); La Palma, 0–50 m, *Pittier* 6620 (US). *Los Santos:* 5 mi. S of Pocri, *Croat* 9743 (MO). *Panamá:* Lago Sororia, NE of Nueva Gorgona, 8°33'N, 79°51'W, 5 m, *de Nevers & Piperno* 10549 (CAS, PMA); Río La Maestra, 0–25 m, *Allen* 42 (MO); Río Pacora, Panama National Highway, *Bartlett* 16479 (MICH), *Bartlett & Lasser* 16951 (MICH), *Nee & Mori* 3615 (WIS); Río Tapia, *Bartlett* 16945 (MICH), *Maxon & Harvey* 6765 (US); vicinity of El Llano, *Duke* 5868 (MO); San José Island, 8°15'N, 79°08'W, sea level, *Harlow* 45 (US), *Erlanson* 510 (US), *Johnston* 816 (US); Taboga Island, *Maxon* 6909 (US), 4 mi. W of Chepo near Inter American Highway, *Tyson* 6737 (MO, PMA); Matías Hernández, *Pittier* 6756 (US).

DISTRIBUTION AND HABITAT. — Southern Mexico throughout Central America, and also in northern Colombia and Venezuela, as far east as Trinidad; drier areas where ground water is present, often in disturbed or seasonally inundated places.

LOCAL NAMES AND USES. — Belize: *hone-pork-and-dough boy*. Guatemala: *coconut-boy, match*. Panama: *caña brava*.

DISCUSSION. — This species is distinguished by its regularly arranged, linear pinnae which have a somewhat metallic sheen when dry, its few, thickened rachillae, its large ellipsoid, purple-black fruits, and its fruiting corolla with staminodial ring. It is closely related to a small group of species (or subspecies) that occur in South America. Burret (1934) cites a type specimen of Jacquin, but did not see it nor give its location.

The leaves of the type specimen of *Bactris superior* are excluded because they appear to belong to a different species, possibly *B. coloniata*.

16. Bactris maraja Mart., Hist. nat. palm. 2:93. 1826.

Fig. 9

Pyrenoglyphis maraja (Mart.) Burret, Repert. Spec. Nov. Regni Veg. 34:252. 1934.

TYPE. — Tab. 71, fig. 1 in Mart., Hist. nat. palm. 2, 1826 (lectotype [designated by Burret, 1933–1934]).

Bactris divisicupula L. H. Bailey, Gentes Herb. 6:230. 1943.

TYPE. — PANAMA. Coclé: El Valle de Antón, 21 May 1939, P. Allen 1817 (lectotype, MO [designated by de Nevers, 1988]; isolectotypes, BH, GH).

Bactris fuscospina L. H. Bailey, Gentes Herb. 6:228. 1943.

TYPE. — PANAMA. Panamá: Cerro Campana, 31 Dec 1939, P. Allen 2086 (lectotype, MO [designated by de Nevers, 1988]; isolectotype, BH).

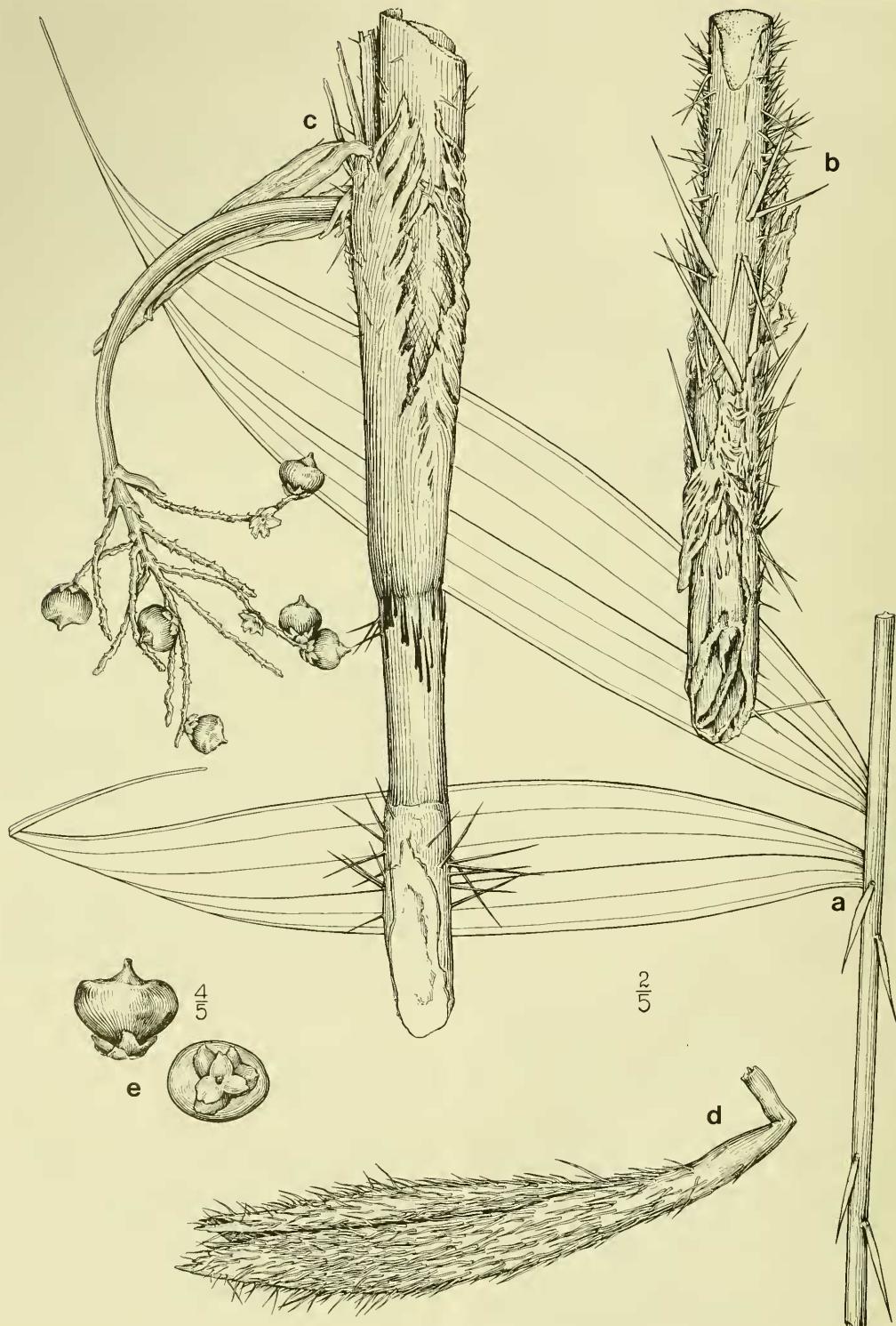
Stems cespitose, in open clusters of 2–15 stems, 3–7 (–10) m tall, 2–4 cm diam, with black spines on internodes. Leaves 3–10, horizontally spreading; sheath 20–35 cm long, sheath, petiole and rachis with moderate to dense covering of flattened, yellowish (occasionally brown or black) spines, when yellowish with black base and apex, to 5 (–10) cm long; petiole 13–60 cm long; rachis 78–130 cm long; pinnae 15–22 per side, irregularly arranged in clusters of 2–5 and spreading in several planes, or regularly arranged and spreading in one plane, sigmoid, middle pinnae 20–48 cm long, 3–6 cm wide. Inflorescences interfoliar; peduncle 16–18 cm long, spiny, curved; prophyll 10–26 cm long; peduncular bract 22–38 cm long, typically brown-vetevety-tomentose, occasionally with flattened spines to 4 mm long or glabrous; rachis 3–5 cm long; rachillae 8–15, 6–15 cm long; triads irregularly arranged amongst paired or solitary staminate flowers; staminate flowers to 3.5 mm long, deciduous; sepals briefly connate below, free above, narrowly triangular, 1 mm long; petals connate below for ca. half their length, free and valvate above, obovate, 3 mm long; pistillate flowers 2.5 mm long (pre-anthesis); calyx 2.5 mm long, exceeding the corolla; corolla 1 mm long; staminodes absent; fruits widely depressed ovoid, rostrate, 1.3–2 cm diam, purple-black at maturity, rarely minutely spinulose; mesocarp juicy; endocarp turbinata; endocarp fibers nu-

merous, terete, black, with juice sacs attached; endocarp pores displaced; fruiting perianth with deeply 3-lobed calyx half as long as the deeply 3-lobed corolla.

ADDITIONAL SPECIMENS EXAMINED. — COSTA RICA. Limón: Sixaola region, between headwaters of Quebrada Mata de Limón and Q. Quiebra Caña, Finca Anai, 9°34'N, 82°40'W, 20–40 m, Grayum et al. 8003 (CAS); woodlands S of La Lola on the railroad, 120 m, Moore 6711 (BH). Puntarenas: Palmar, Schubert 1184 (A).

PANAMA. Canal Area: Barro Colorado Island, Bailey 505 (BH); Skunk Hollow, Caribbean side, Blum 1496 (MO); Agua Salud, Cook & Martin 63 (US); Pavón road W of Gatún Locks, Johnston 1538 (BH); near Marú Towers W of Gatún Locks, Johnston 1552 (BH); along Río Petitpie from road to Ft. Sherman from Gatún Locks, Mori & Kallunki 2704 (MO); Pipeline road near Gamboa, 50 m, Nee 7846 (MO, PMA, NY); Frijoles, Stevens 1185 (US). Colón: Santa Rita Ridge, Croat 14182 (MO). Darién: N base of Cerro Pirre, along Quebrada Perisenico, 8°01'N, 77°44'W, 70–270 m, de Nevers et al. 8263 (MO); Parque Nacional del Darién, ridge between Río Topalisca & Río Pucuro, ca. 13 km E of Pucuro, 500 m, 8°03'N, 77°20'W, de Nevers et al. 8331 (CAS); Río Urutí, Duke & Bristan 220 (MO, US); Mamey, Whitefoord & Eddy 348 (PMA). Panamá: Cerro Jefe, Allen 3440 (BH, MO); Cerro Azul, Croat 11551 (MO); 3 mi. NE of Alto Pacora, 500–800 m, Croat 22767 (MO); Cerro Campana, Dwyer et al. 4859 (BH, MO); El Llano-Cartí road, km 8.5, Nee & Warmbrodt 10400 (MO). San Blas: El Llano-Cartí road km 19, 350 m, 9°19'N, 78°55'W, de Nevers et al. 6127 (MO, PMA), de Nevers & Hammel 8550 (CAS), Galdames et al. 1350 (PMA); Cangandí, 9°24'N, 79°24'W, 0–30 m, de Nevers et al. 6444 (MO), 7121 (MO), 7697 (MO), Herrera 243 (CAS); opposite Isla Miria Ubigandup, Río Ailigandi, 9°26'N, 78°54'W, 0–20 m, Herrera & Harris 556 (MO); Aila Tiwar, 8°48'N, 77°40'W, 25–100 m, Sugden 430 (MO).

DISTRIBUTION AND HABITAT. — Costa Rica (Limón, Puntarenas), Panama (Canal Area, Coclé, Colon, Darién, Panamá, San Blas) and throughout northern South America in Colombia (Amazonas, Antioquia, Choco, Vaupés, Vichada), Venezuela (Amazonas), the Guianas, Ecuador (Napo), Peru (Amazonas, Loreto, Madre de Dios, Ucayali), Brazil (Acre, Amapá, Amazonas, Pará, Rondônia, Roraima), and Bolivia (Beni, La Paz); tropical moist forest, tropical wet forest, premontane wet forest, and



premontane rain forest, usually on terra firme but occasionally in inundated areas, at low elevations but occasionally reaching 1000 m elevation. It is remarkable that L. H. Bailey collected *B. maraja* on Barro Colorado Islnad in the 1930s, but when Tom Croat did intensive field work there in the 1970s he did not find it.

LOCAL NAMES AND USES. — Panama: *alar*, *gui*, *gui wala* (Kuna), *uvita*. The fruits are sucked by the Kuna for their flavor.

DISCUSSION. — This species is characterized by its flattened whitish or yellowish spines, glabrous leaves with grouped, sigmoid pinnae with a prominent drip-tip, and obovoid, purple fruits.

Bactris maraja Mart. is one of the few names validly lectotypified by Burret. His reference to the "von Martius veschriebenen und abgebildeten Fruchtkolben der als Typus der Art anzusehen" (Burret, 1933–34:253) satisfies the requirement of the Code (Greuter et al., 1988, art. 8.3) that the word "type" or its equivalent appear. According to Burret (1933–34:252), fruits and a rachilla from the infructescence illustrated by Martius, labeled in Martius's hand, were deposited at B. We cannot confirm the existence of this material; in any case, Burret clearly intended the illustration of the entire infructescence ("fruchtkolben," "spadicem fructiferum") for typification, rather than the preserved fragments.

17. *Bactris mexicana* Mart. in A. D. Orb., Voy. Amér. mér. 7(3), Palmiers 65. 1844.

TYPE. — MEXICO. Veracruz: Misantla, Mar 1827, C. Schiede s.n. (holotype, M, n.v.).

Stems cespitose, 2–3 m tall, 2–3.5 cm diam, usually spiny on internodes. Leaves 5–7; sheath 20–37 cm long, moderately to densely covered with black spines to 3 cm long; petiole 35–100 cm long, occasionally with black spines to 7 cm long, these white-bulbous-based and tending to be clustered; rachis 0.8–1.5 m long, occasionally with black spines to 6.5 cm long; pinnae 8–26 per side, irregularly arranged in clusters and spread-

ing in different planes, or regularly arranged (but with gaps) and spreading in the same plane, linear to sigmoid, narrowed at base, aristate, the middle ones (30–) 45–60 cm long, 2–5 cm wide, glabrous or scarcely to densely pubescent abaxially, the margins often minutely spiny with 3 mm long, straight spines. Inflorescences interfoliar; peduncle 6–15 cm long, 0.8–1.3 cm wide, recurved, densely covered with short spines; prophyll 9–14 cm long, 2–4 cm wide; peduncular bract 19–25 (–30) cm long, 3–5 cm wide, densely covered with short black spines to 1 cm long; rachis 1.2–6.5 cm long; rachillae 12–36, 8–16 cm long, 1 mm diam at anthesis; triads irregularly arranged amongst paired or solitary staminate flowers; staminate flowers 2–3 mm long; sepals very briefly connate below, lanceolate, 1 mm long; petals 3 mm long; pistillate flowers 3 mm long; calyx 1 mm long; corolla minutely 3-lobed apically, 3 mm long; staminodes minute; fruits obovoid, stigmatic residue prominent, occasionally rostrate, 0.8–1.2 cm long, 0.9–1.2 cm diam, orange; mesocarp mealy, fibrous; endocarp turbinate, not pitted; endocarp fibers very few; endocarp pores equidistant; fruiting perianth with a minutely 3-lobed, 1 mm long calyx and truncate to crenate, corolla 3 mm long.

DISTRIBUTION AND HABITAT. — Mexico (Chiapas, Oaxaca, Tabasco, Veracruz), Guatemala (Alta Verapaz, Izabal, Petén), Belize (Cayo, Stann Creek, Toledo), Honduras (Atlántida), and Nicaragua (Zelaya); lowland rainforest below 600 m elevation.

DISCUSSION. — We have not seen the types of *Bactris mexicana*, *B. baculifera* or *B. trichophylla*, but judging from their descriptions, and the fact that *B. mexicana* is the only species of *Bactris* in Mexico and Belize with orange fruits, the latter two names belong here. On the Atlantic slope of Nicaragua and Costa Rica, a few specimens (Robles 1668, Grijalva 1535) have leaves which overlap in characters between *B. mexicana* and *B. gracilior* (under which see discussion).

Two taxa are recognizable amongst the specimens examined, each with a more or less discrete



FIGURE 9. *Bactris maraja* (Allen 1817). A. Midsection of leaf. B. Stem, showing flattened spines. C. Infructescence, with recurved peduncle. D. Peduncular bract. E. fruit in two views. All $\times 2/5$ except E (4/5). Courtesy of the L. H. Bailey Hortorium, Cornell University.

geographic range. There is, however, overlap of character states in specimens from Chiapas and northern Guatemala, and so we recognize the two as varieties.

Key to the varieties of *Bactris mexicana*

1. Pinnae sigmoid, irregularly arranged in clusters and spreading in different planes, glabrous abaxially; petiole and rachis with scattered, black spines..... 17a. *B. mexicana* var. *mexicana*.

1. Pinnae linear, regularly arranged (but with gaps) and spreading in the same plane, pubescent abaxially; petiole and rachis usually without spines..... 17b. *B. mexicana* var. *trichophylla*.

17a. *Bactris mexicana* var. *mexicana*

Bactris acuminata Liebm. ex Mart., Hist. nat. palm. 3:321. 1853.

TYPE. — Mexico. Oaxaca: Chinantla, Oct 1842, F. Liebmann 10797 (holotype, C; isotypes, MO, P, US).

Bactris baculifera Karw. ex Mart., Hist. nat. palm. 3:322. 1853.

TYPE. — Mexico. Veracruz: Jicaltepec, W. Karwinsky s.n. (holotype, BR?, n.v.).

ADDITIONAL SPECIMENS EXAMINED. — MEXICO. Chiapas: Mpio. Ocozocoautla, 46 km N of Ocozocoautla on road to Mal Paso, 700 m, Breedlove 38304 (CAS, MO); Mun. Palenque, 50 km SW of Palenque on road to Ocósingo, near Colonia Ursulo Galvano, 370 m, Breedlove 47360 (CAS); 80 km SW of Palenque on road to Ocósingo, 760 m, Breedlove & Almeda 57205 (CAS, NY). Oaxaca: "in sylvis densis," Liebmann 10796 (US); Mpio. Santa María Chimalapa, Arroyo Margo, 16°55'N, 94°39'W, 250 m, Hernández 390 (CAS, MO); Loma Bonita, Hernández 600 (NY), Hernández 694 (MO); Mpio. Sta. María Chimalapa, Paso Napajoa del Río Negro, 16°51'N, 94°40'W, 300 m, Hernández 694 (MO); 37 mi. from Empalme Balboa beyond Mathias Romero, Moore 6353 (NY, US). Tabasco: 8.2 km from Fco. Rueda, Cowan et al. 3985 (NY); Retiro, Tenosique, Matuda 3478 (MO, US). Veracruz: Mpio. Hidalgotitlán, Río Soloxuchil, 100 m, Aguilar 151 (NY); Mpio. Choapas, Las Cruces, Gómez-Pompa 1516 (F); Los Tuxtlas, 18°34'N, 95°04'W, 160 m, Aguilar 144 (NY), Calderón 2130 (F), Gentry et al. 32307 (MO), Ibarra M. & Sinaca C. 1967 (MO), Ibarra s.n. (NY); Maloapam, Liebmann 10792 (MO); Pital, Liebmann s.n. (NY); 4 km beyond Nanchitla on road to Villahermosa, Moore 8065 (BH);

Agustín Melgar, 17°15'N, 94°33'W, 100 m, Nee 29759 (F, NY).

LOCAL NAMES AND USES. — Mexico: *chischi*, *juncos*.

17b. *Bactris mexicana* var. *trichophylla* (Burret) A. Henderson, stat. nov., *Bactris trichophylla* Burret, Repert. Spec. Nov. Regni Veg. 32:113. 1933.

TYPE. — BELIZE. Stann Creek: 19 mile, Stann Creek Valley, W. Schipp S368 (holotype, B, destroyed).

NEOTYPE. — BELIZE. Toledo: Río Grande, ca. 80 m, W. Schipp S520 (B, here designated).

ADDITIONAL SPECIMENS EXAMINED. — MEXICO. Chiapas: Mun. La Trinitaria, 15 km ENE of Dos Lagos, above Santa Elena, 1000 m, Breedlove 56585 (CAS); Mun. Ocósingo, Bonampak, 1200 ft., Breedlove 15721 (CAS); Mun. Palenque, 6–12 km S of Palenque, 300 m, Breedlove & Dressler 29771 (CAS).

BELIZE. Belize: 42.5 mi. NW of Belize along Northern Highway, Croat 23972 (MO); along Western Highway at mi. 35, Croat 24788 (MO). Cayo: near Vaca, Gentle 2575 (MICH), 2586 (MICH); Valentín, Lundell 6284 (MICH); Mollejon Cr., on Raspa road 10 km S of Augustine, 500 m, Meave & Howe 1361 (MO); north boundary of Roaring River Estates, 50 m, Spellman & Newey 1686 (MO); Cotton Tree Creek, 0.5 km W of Guacamallo Bridge, 500 m, Sutton et al. 50 (MO). Stann Creek: Prospects, Maskall road, Gentle 900 (MICH); Maskall-Bakers road, Gentle 1373 (MICH, MO); Stann Creek Railway, 15 mi., Gentle 2105 (MICH); Middlesex, Gentle 2901 (MICH); between Rancho Chico and Cockscomb, Monkey River, Gentle 4313 (NY); Humming Bird Highway, Gentle 9225 (CAS, MO, NY). Toledo: Bladen Watershed, 16°35'N, 88°45'W, 140 m, N. Brokaw 136 (NY); ca. 5 mi. W of Columbia Forest Station, Croat 24340 (MO); Solomon Camp, junction of Richardson Creek and Bladen Branch, 16°32'N, 88°45'W, 80–420 m, Davidse & Brant 32059 (MO); trail to Esperanza, beginning 1 mi. N of Columbia Forest Station, Dwyer 11101 (MO); Maya Mts., Columbia Forest Reserve, 16°22'N, 89°10'W, Holst 4501 (MO, NY).

GUATEMALA. Alta Verapaz: Trece Aguas, Cook & Doyle 1 (US); Secangunin, Cook & Doyle 47 (US), 48 (US); Sepacuite, Cook & Doyle 16 (US); Cubilgüitz, 300–350 m, Steyermark 44418 (F, MO, NY). Izabal: ca. 7 mi. S of Puerto Barrios, 50 m, Croat 41807 (MO); Puerto Barrios, Standley 24984 (NY, US). Petén: Tikal, Bartlett 12605 (MICH), Contreras 66 (CAS, MO, NY); 5 mi. S of entrance to Tikal National Park, Croat 24752 (MO); Santa Teresa, Río

Subin, Lundell 2655 (MICH); Hiltun, Lundell 3588 (MICH); NW of Chinajá, Steyermark 45494 (F).

HONDURAS. Atlántida: Lanceilla, 15°41'N, 87°28'W, 450–590 m, MacDougal et al. 3386 (NY), Standley 56776 (US), 300 ft., Yuncker 4991a (MO, NY), Yuncker 4991b (MO). Colón: lower slopes of Puerto Arturo, along trail to Río Negro Dam, ca. 200 ft., Saunders 614 (MO).

NICARAGUA. Zelaya: costado SW de Cerro El Hormiguero, 13°44'10"N, 84°59'50"W, 900–1000 m, Grijalva 502 (MO); 84.5 km SE of Siuna, ca. 13°40'N, 84°45'W, Grijalva & Burgos 1535 (MO); near Río Okanwas, 12 mi. E of Rosita, Neill 4480 (MO); Comarca del Cabo, Miguel Bikou, Robbins 5875 (MO); road to Alamikamba, 13°32'N, 84°30'W, 25 m, Stevens 21746 (MO, NY).

LOCAL NAMES AND USES.—Belize: *hone*. Guatemala: *huiscoyol*.

18. *Bactris militaris* H. E. Moore, Gentes Herb. 8:229. 1951.
Fig. 10

TYPE.—COSTA RICA. Puntarenas: Cantón de Osa, near Tinoco Station, 30 April 1949, P. Allen 5276 (holotype, BH; isotype; US).

Stems cespitose, 1–5 m tall, 2.5–4 cm diam, in tight clumps of 5–20 stems. Leaves 5–8, simple and bifid, erect, arching at the tips, strongly plicate; sheath to 37 cm long, sparsely to densely covered with black spines to 8.5 cm long; petiole to 43 cm long, usually without spines; rachis to 2.8 m, without spines or with a few spines to 7 cm long; blade to 3.1 m long, to 25 cm wide at apex of rachis, elongate cuneate-ob lanceolate in outline, very gradually expanded from a narrowly cuneate base to the bifid apex, without cross-veins. Inflorescences interfoliar; peduncle 20–38.5 cm, straight and erect in fruit, not spiny; prophyll 13–19 cm long; peduncular bract 30–49 cm long, densely tomentose, sparsely covered with slender brown spines to 4 mm long; rachis to 10 cm; rachillae 7–23, 1.5–6 cm long; triads scattered amongst paired or solitary staminate flowers; staminate flowers 4 mm long; sepals connate below, free and spreading above, 1 mm long; petals connate below for ca. half their length, free and valvate above, 4 mm long; pistillate flowers 3 mm long; calyx 0.5 mm long; corolla 3 mm long; staminodes minute or absent; fruits very widely obovoid, indistinctly rostrate,

1.5–1.7 cm diam, red or orange, glabrous; mesocarp mealy; endocarp turbinate, pitted or smooth; endocarp fibers few, broad or terete, without juice sacs; endocarp pores equidistant; fruiting calyx minute, corolla 2 mm.

ADDITIONAL SPECIMENS EXAMINED.—COSTA RICA. Limón: Sixaola region, Finca Anai, 9°34'N, 82°40'W, 25–30 m, Grayum et al. 4476 (MO); Refugio Barra del Colorado, between Río Chirripocito and Río Sardina, Grayum et al. 8984 (MO); between the Río Madre and Blanco, shore at Moín, Atlantic coast, sea level, Pittier 16715 (US). Puntarenas: near Tinoco Station, sea level, Allen 6264 (BH), 6296 (BH), Hodel et al. 1353 (BH, MO).

PANAMA. Colón: Santa Rita ridge, km 10, 350 m, de Nevers et al. 10648 (CAS, COL, MO, NY, PMA).

DISTRIBUTION AND HABITAT.—Atlantic coast of Costa Rica (Limón) and Panama (Colón), and probably into adjacent Nicaragua, rarely on the Pacific side of Costa Rica (Puntarenas); low, wet, swampy sites near the sea, or on slopes, to 400 m elevation.

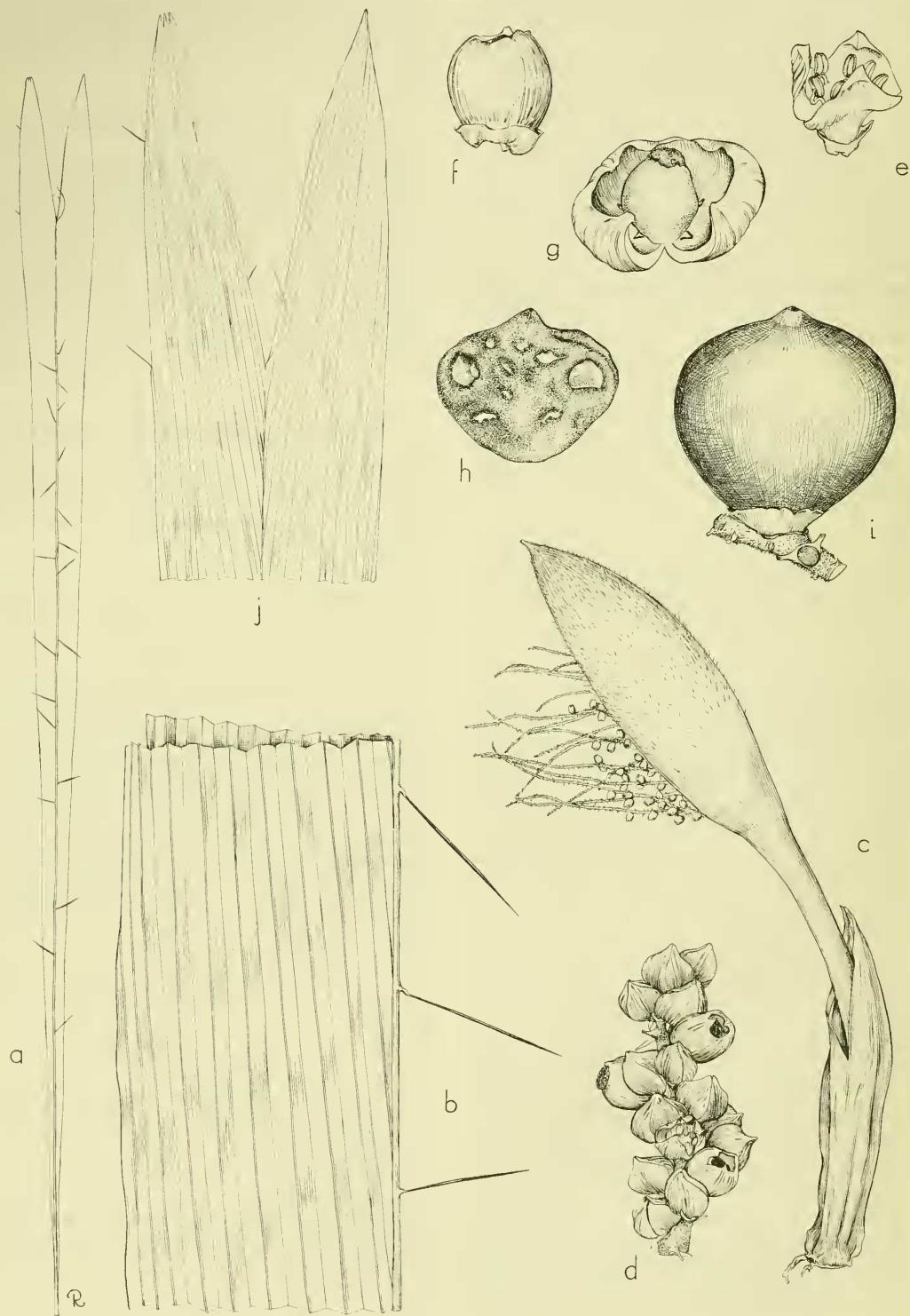
DISCUSSION.—This species is distinct by its long, narrow, simple leaves. It shares a straight, erect fruiting peduncle only with *B. hondurensis*, *B. charnleyae* and *B. panamensis*.

The fruits of *Bactris militaris* are variable. Those from the Pacific side of Costa Rica (Allen 6264, 6296) are red and have pitted endocarps with few, flattened endocarp fibers; those from the Atlantic coast of Costa Rica and Panama (de Nevers et al. 10648, Grayum 8984, Pittier 16715) have orange fruits and smooth endocarps with numerous terete fibers which appear to have juice sacs attached and appear to originate in tubercles. More specimens are needed to decide if two taxa exist.

19. *Bactris panamensis* de Nevers & Grayum, sp. nov.
Fig. 11

TYPE.—Panama. Panamá: Cerro Jefe, 9°15'N, 79°30'W, 650 m, 27 Aug 1986, G. McPherson 9992 (holotype, MO).

Statura parva Bactris hondurensi similis sed foliis pinnatis pinnis subtus concavis apice prominenter caudatis fructibus parvioribusque.



Stems cespitose, 1.5–3 m tall, 0.7–0.9 cm diam. **Leaves** number unknown; sheath 13–22 cm long, sheath and petiole sparsely to densely black-spiny, the spines to 2.8 cm long; petiole 18–28 cm long; rachis 31–62 cm long, without spines or rarely with occasional spines to 2.5 cm long; pinnae 15–19 (–25) per side, irregularly arranged in clusters of 2–3 in proximal half of leaf, more regularly arranged distally, the middle ones 10–19 cm long, 1.6–3.6 cm wide, narrowly to broadly elliptical or oblanceolate, often sigmoid, without obvious cross-veins, marginally setose with the setae to 2 mm long. **Inflorescences** interfoliar; peduncle 3.5–6 cm long, erect to arching, with appressed, blackish spines to 1.5 mm long; prophyll not seen; peduncular bract ca. 8.5–12.5 cm long, covered with blackish spines to 1.2 cm long; rachis 1.5–2 cm long; rachillae 8–12, 2–3.4 cm long, 0.5 mm diam; triads irregularly arranged and scattered amongst paired or solitary staminate flowers; staminate flowers not seen; pistillate flowers 3 mm long; calyx 0.5 mm long, shallowly cupuliform, hyaline, glabrous, not striate, with acute lobes; corolla 2.5 mm long, campanulate to urceolate, acutely 3-lobed to one-third to base, striate, glabrous; fruits ovoid, prominently rostrate, 0.7–1 cm long, 0.7–0.8 cm diam, orange, striate, glabrous; mesocarp very thin, mealy; endocarp turbinate; endocarp fibers lacking; endocarp pores equidistant; fruiting calyx minute, corolla 3–4 mm long, deeply 3-parted at apex by enlarging fruit, with 6 minute staminodia.

ADDITIONAL SPECIMENS EXAMINED. — PANAMA. Chiriquí: Gualaca-Chiriquí Grande road, near Continental Divide, 1075 m *de Nevers et al.* 8765 (CAS, PMA). Coclé: El Copé, *Moore et al.* 10535 (BH). Colón: Santa Rita Ridge, km 13.8, 9°20'N, 79°45'W, 350 m, *de Nevers* 7204 (MO), km 20.7, 9°23'N, 79°40'W, 530 m, *Foster et al.* 14082 (PMA). Panamá: Campo Tres, 3 mi. NE of Altos de Pacora, *Croat* 22727 (MO); El Llano-Cartí road, km 12, *Croat* 26072 (MO); Cerro Jefe, 1000 m, *Croat* 17346 (MO), *Correa et al.* 10623 (PMA), *Folsom & Page* 5935 (MO), *Read et al.* 81-5 (MO, US). San Blas: Cerro

Brewster, 9°18'N, 79°16'W, 850 m, *de Nevers* 4050 (MO), 5527 (MO, NY), 5555 (MO, NY).

DISTRIBUTION AND HABITAT. — Panama (Chiriquí, Coclé, San Blas, Panamá, Veraguas); tropical wet forest between 300 and 1200 m elevation.

DISCUSSION. — This species is known from scattered localities along the Atlantic coast of Panama. It is similar to *Bactris hondurensis* and *B. charnleyae* in its small stature. It can be separated from those by its pinnate leaves and concave pinnae with prominent drip-tips. The fruits are smaller than those of *B. hondurensis*. It can be distinguished from *B. charnleyae* by the lack of endocarp fibers and lack of long spines on the peduncle and peduncular bract.

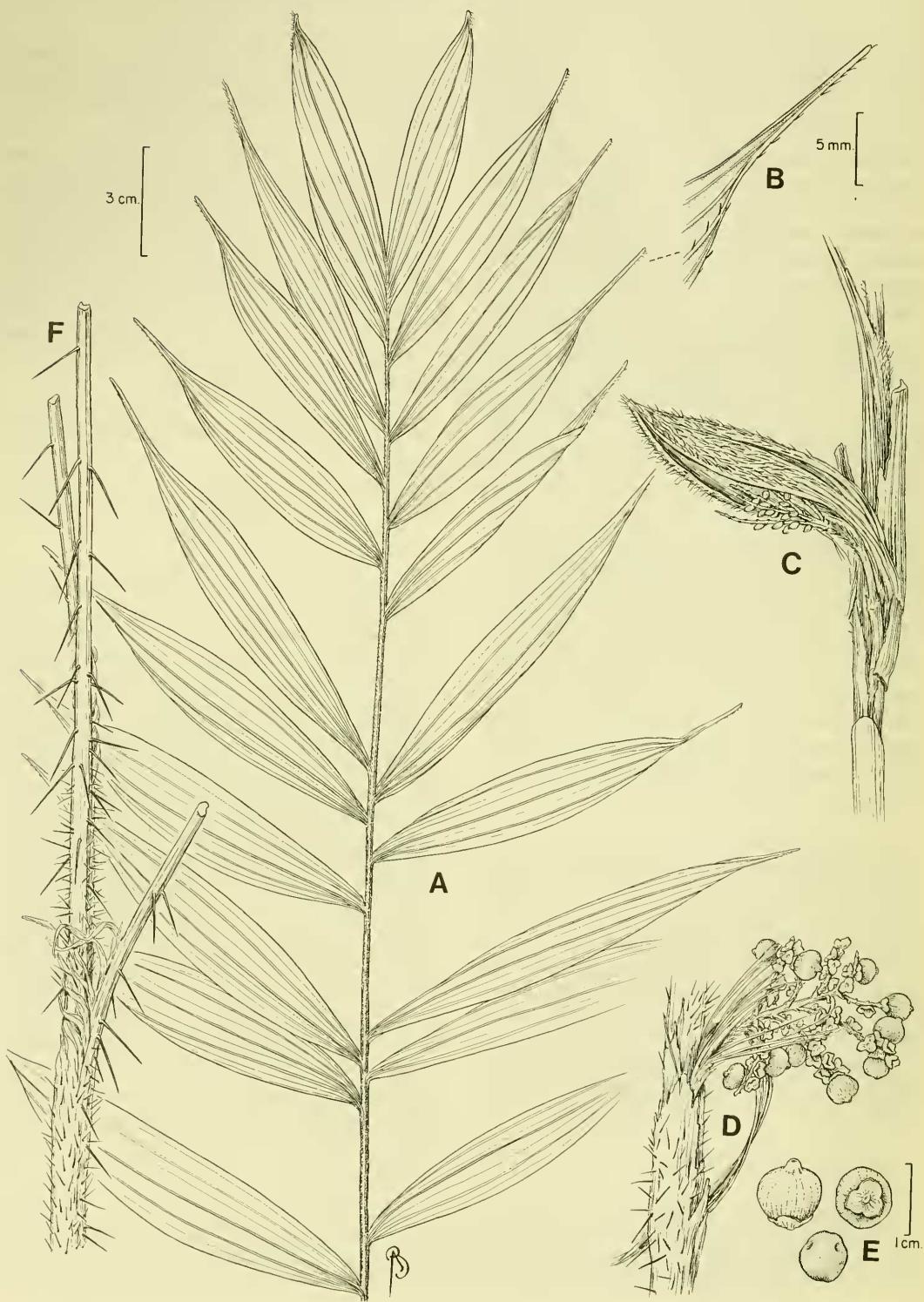
20. *Bactris pilosa* H. Karst., Linnaea 28:405. 1856.

TYPE. — Venezuela. Zulia: Maracaibo, *H. Karsten s.n.* (W, n.v.; F neg. 31316).

Stems cespitose and forming large, dense clumps, or rarely solitary, 2–10 m tall, 2.5–4 cm diam, spiny. **Leaves** 4–8; sheath 20–80 cm long, sheath, petiole and rachis moderately to densely covered with brown or black spines to 5 cm long; petiole 28–60 cm long; rachis 1.2–2.2 m long; pinnae 59–68 per side, regularly or irregularly arranged, spreading in the same or different planes, linear, aristate, middle pinnae 27–47 cm long, 1.5–2.2 cm wide, slightly to densely pilose on adaxial and abaxial surface. **Inflorescences** interfoliar, peduncle 14–35 cm long, recurved, not spiny; prophyll 16–18 cm long; peduncular bract 27–47 cm long, densely covered with soft, appressed, brown spines, with longer, black spines intermixed; rachis 4–6 cm long; rachillae 6–26, 13–25 cm long; triads scattered amongst paired or solitary staminate flowers; staminate flowers 3.5 mm long; sepals very briefly connate below, free and spreading above, linear, 1 mm long; petals connate below for ca. one third their length, free and valvate above, 3.5 mm long;



FIGURE 10. *Bactris militaris* (Allen 5276). A. Leaf shape $\times 1/21$. B. Midsection of leaf $\times 1/3$. C. Inflorescence $\times 1/3$. D. Portion of flowering rachilla $\times 2$. E. Staminate flower $\times 4$. F. and G. Pistillate flower, side view and expanded $\times 4$. H. Pitted endocarp $\times 1.5$. I. Fruit $\times 1.5$. J. Leaf apex $\times 1/9$. Courtesy of the L. H. Bailey Hortorium, Cornell University.



pistillode absent; pistillate flowers (post-anthesis) 4 mm long; calyx 4 mm long, covered with very short bristles; corolla urceolate, 1.5 mm long, lepidote; staminodes absent; fruits depressed obovoid, rostrate, 2–2.5 cm long, 1.3–2 cm diam, purple-black, covered with very short bristles; mesocarp juicy; endocarp turbinate; endocarp fibers numerous, with juice sacs attached; endocarp pores equidistant; fruiting perianth with corolla shorter than the calyx.

ADDITIONAL SPECIMENS EXAMINED. — PANAMA. Darién: road to Pinogana near El Real, Croat & Porter 15479 (MO); Cerro Pirre, 8°N, 77°47'W, Croat 68989 (MO), de Nevers 8242 (CAS); Perrecenico River, Duke & Bristan 244 (MO, US); Río Pirre, 2–5 mi. above El Real, Duke 5076 (MO), 5467 (MO).

DISTRIBUTION AND HABITAT. — Eastern Panama (Darién), Colombia (Antioquia, Bolívar, Chocó, Sucre, Tolima) and Venezuela (Táchira, Zulia); lowland forest below 600 m elevation.

LOCAL NAMES AND USES. — Panama: *sansagarrá* (Embera), *uvita*.

DISCUSSION. — This species is characterized by its pubescent, purple fruits, truncate fruiting corolla slightly shorter than the calyx, large inflorescence, and pubescent leaves. The pinna pubescence is identical to that of *B. glandulosa*. *Bactris glandulosa* differs from *B. pilosa* in its regularly arranged triads, smaller, glabrous fruits, and fruiting calyx much shorter than the corolla.

INVALIDLY PUBLISHED NAMES

Bactris longipetiolata H. Wendl., nomen nudum, in Hemsl., Biol. centr.-amer., Bot. 3:412. 1885.

Bactris polystachya H. Wendl., nomen nudum, in Hemsl., Biol. centr.-amer., Bot. 3:413. 1885.

Bactris subglobosa H. Wendl., nomen nudum, in Kerch., Palmiers 234. 1878.

Bactris villosa H. Wendl., nomen nudum, in Hemsl., Biol. centr.-amer., Bot. 3:413. 1885.

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LITERATURE CITED

- BERNAL, R. 1989. Proposal to conserve *Bactris gasipaes* Kunth against *Bactris ciliata* (R. & P.) C. Martius (Palmae). Taxon 38:520–522.
- BRUMMITT, R. 1993. Report of the Committee for Spermatophyta: 38. Taxon 42:687–697.
- BURRET, M. 1933. *Bactris* und verwandte Palmengattungen. Repert. Spec. Nov. Regni Veg. 34: 167–184.
- _____. 1933–1934. *Bactris* und verwandte Palmen-gattungen. Repert. Spec. Nov. Regni Veg. 34: 185–253.
- CASTILLO, G. AND J. BEER 1983. Utilización del bosque y de sistemas agroforestales en la región de



FIGURE 11. *Bactris panamensis* (McPherson 9992). A. Leaf apex. B. Drip-tip, showing venation. C. Inflorescence, showing erect peduncle. D. Infructescence. E. Fruit in two views and endocarp (below). F. Stem and leaf bases. A, C, D and F same scale.

- Gardí, Kuna Yala (San Blas), Panama. CATIE. Turrialba, Costa Rica.
- CHAZDON, R. 1985. Key to the palms of Finca La Selva, Costa Rica. *Principes* 29:82–84.
- _____. 1987. The palm flora of Braulio Carrillo National Park, Costa Rica. *Brenesia* 28:107–116.
- CLEMENT, C. AND J. MORA URPI. 1987. Pejibaye palm (*Bactris gasipaes*, Arecaceae): multi-use potential for the lowland humid tropics. *Econ. Bot.* 41: 302–311.
- DAHLGREN, B. 1936. Index of American Palms. Field Mus. Nat. Hist., Bot. Ser. 14:1–456.
- _____. 1959. Index of American Palms. Plates. Field Mus. Nat. Hist., Bot. Ser. 14:pl. 1–412.
- DE NEVERS, G. 1988. *Bactris divisicupula* and *Bactris fuscospina* reexamined. *Ann. Missouri Bot. Gard.* 75:1151–1152.
- GLASSMAN, S. 1972. A revision of B. E. Dahlgren's Index of American Palms. *Phanerog. Monogr.* 6: 1–294.
- GREUTER, W., ED. 1988. International Code of Botanical Nomenclature. Koeltz Scientific Books, Königstein, Germany.
- HENDERSON, A., G. GALEANO AND R. BERNAL 1995. A Field Guide to the Palms of the Americas. Princeton University Press, Princeton, NJ.
- MOORE, H. E., JR 1963. The types and lectotypes of some palm genera. *Gentes Herb.* 9:245–274.
- OERSTED, A. 1859. *Palmae centroamericanae*. Vidensk. Meddel. Dansk Naturhist. Foren. Kjøbenhavn 1858:1–54.
- _____. 1863. L'Amérique Centrale. F. S. Muhle, Copenhagen.
- SANDERS, R. 1991. Cladistics of *Bactris* (Palmae): survey of characters and refutation of Burret's classification. *Selbyana* 12:105–133.
- TRAIL, J. W. H. 1877. Descriptions of new species and varieties of palms collected in the valley of the Amazon in north Brazil, in 1874 (Continued). *J. Bot.* 15: 40–49.
- VENTOCILLA, J. 1992. Cacería y subsistencia en Cangandí, un pueblo de los indígenas Kunas. ABYAYALA #23. Quito, Ecuador.